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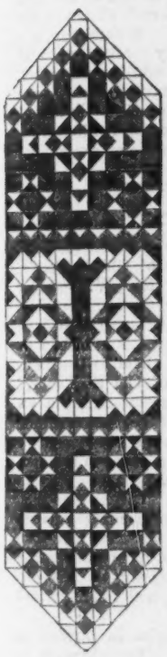


Notes on Roman Mosaic Designs.

In one corner of the Architectural Court at South Kensington, in the centre of which stands the cast of one of the most remarkable monuments of Roman greatness in arts and arms, is a not much noticed stand of drawings on a turning frame, which illustrates very largely the character of Roman art in one very beautiful and interesting class of work. These are the drawings collected by Dr. Wollaston, and presented to the Museum by Mrs. Wollaston, of Greek and Roman mosaic designs. The Greek designs, however, form but a small portion of the whole, the majority are Roman. The originals of a few of the examples hang in the corridor running down the centre of the Architectural Court; the originals of a good many others, including some of the best specimens, are in that cellar at the British Museum, reached by a staircase from the Græco-Roman court, to which so few visitors go, and where it is so difficult to see most of the specimens properly when one does go. A considerable number of the Wollaston drawings also illustrate specimens of mosaic, the originals of which are not in England, or not accessible to the public.

The variety in taste and style, as well as in merit, of these designs, is rather remarkable when we regard them collectively, and not less remarkable is the extent of resemblance we frequently find to some later school of design not generally supposed to be much connected with Roman influence. That there should be close resemblances between Roman and Renaissance design is, of course, natural, but we find new phase in the relations of the two styles when we consider mosaic, compared with what we find in considering Roman architectural carved ornament. The first drawing in the Wollaston set which we happened to turn to, for instance, a pavement found at Orbe, in Switzerland, looks singularly like a Renaissance ceiling design turned into a floor. The exactly reverse operation has, no doubt, been the origin of some of the Renaissance ceiling designs,—they have been suggested by Roman mosaic pavements. At present we only know of a few scattered examples of Roman mosaic, such as the one now referred to, which might suggest this form of panelled ceiling with little designs in brighter colour in the principal panels. But at the time of the Renaissance there might have been more numerous examples, of which many have perished since. The transplanting of the design from floor to ceiling is natural enough. Mosaic floors were not in such general use at the Renaissance period as to render it a natural thing to reproduce the Roman mosaic in the same position. The style of design shown in imitation panels in the Roman mosaics became reproduced in the real panelling and painted decoration of the Renaissance ceiling.

No one can doubt the connexion who looks at this and some other mosaic designs in the Wollaston drawings. But a more unexpected resemblance to some characteristics of Saracenic work is to be traced, and seems to us to have passed unnoticed. In a pavement from Fliessem, in Rhenish Prussia, is to be found precisely the arrangement which is common in many of the best specimens of Saracenic wall diaper; the arrangement of hexagons with squares subtending each side of the hexagon and filling up the intervening spaces. This pavement, indeed, suggests the idea that some one had got hold of a Moorish design and translated it into Classical detail. We are not accustomed to connect Saracenic work with Roman in any historical sequence; yet this strong resemblance can hardly be accidental. If one Roman design of this type has been found preserved to this day, we know not how many there may have been about in the times when Saracenic art took its rise, or how far the details of the latter may have been influenced by Roman forms which have passed away leaving hardly any traces. A large-scale diaper pattern which fills up the border of this Fliessem pavement is also very curious and semi-Oriental in style when regarded as Roman work, though it is not so much without its resemblances in other known Roman examples. It is an illustration of the liking of the Romans for patterns composed of curiously-intercepted segments of circles, a type also common in Saracenic work. Another design found at Fliessem is a remarkably fine instance of this, a very elaborate combination of circles and hexagons. Mosaic, in fact, lends itself so well to the working of what may be called puzzle-patterns that it is not surprising to find a good many of these among Roman mosaics. Sometimes, as in the case of a black and red design from Nantes among the Wollaston drawings, the patterns have the appearance of a kaleidoscope arrangement,—representing, it must be admitted, ingenuity rather than art. In fact, as we have observed, almost every degree of merit is found, from rough work which is commonplace enough both in its idea and its workmanship, to grand and bold design which represents almost the finest decorative character that can be obtained in mosaic, except for the want of that finish and neatness in laying which seems especially the characteristic of modern mosaic work.

Some people will consider the comparative roughness and irregularity of the Roman specimens an artistic advantage; and perhaps, when a mosaic design is on a large scale, and covers a considerable area, it does gain in effect by a certain degree of roughness and irregularity of line, and the appearance seems in keeping with the method and nature of the material. At all events, this rather irregular character of Roman mosaic should be taken into account when forming a judgment of the appearance of a design from drawings only. It is an almost ineradicable habit of draughtsmen, in making a drawing of antique ornamental work of this kind, to reduce it all to symmetrical neatness in every detail, and thereby a wrong impression of the effect of the original is conveyed. The difference between the effect of a drawing of this kind, and of the real work, is very perceptible on comparing the fine floor mosaic from Halicarnassus, which fills great part of the front room of the Græco-Roman cellar of the British Museum, with the drawing of it in the Wollaston collection. The drawing, for example, represents the border design of leaves growing from alternate sides of an undulating stalk as completely regular and symmetrical, and as if drawn out with the aid of compasses, whereas, in the original, the work is apparently put in by eye, or with the roughest measurement only, and is considerably irregular. In some other specimens in the British Museum this want of regular spacing and lining is so marked as to become a positive defect, and very disagreeable to the eye.

Besides the combination of intersecting arcs of circles, we find, as the most prevalent form in Roman mosaic ornament, a zigzag border, formed by alternate pyramids of dark and light, the joining-line giving the zigzag effect, in a manner similar to some forms of Celtic ornament. Various forms of the square Greek fret are found, few of them equal to the best Greek examples, however; in one instance, a piece of pavement found at Cotterstock, and now hanging on the wall of the Roman court at the British Museum, the Greek fret is used in a diagonal or lozenge shape, not very common in Roman work, and not at all Roman in appearance. A favourite form of diaper ornament, we regret much to have to say, is a design showing cubes shaded so as to appear in perspective, and as as if standing up edgeways from the floor-plane. Nothing could be in worse taste or look worse; and it is curious that this false taste for imitation relief seems to have beset the Roman mosaicist even in the middle of otherwise excellent work. Among the specimens from Carthage, in the British Museum cellar, for instance, is a large piece of very good and tasteful floor diaper, formed of rhomboids and squares, perfectly flat in appearance; but surrounding this is a border, the principal space of which is shaded so as to look like successive ridges and hollows. It does not seem to belong to the centre design in taste at all. The bead and reel ornament is frequently found, usually on rather a large scale; but it must be confessed it does not look effective in

flat work, where it loses the effect obtained by shadow on the surface and between the beads. But the favourite ornament of the Roman mosaicist, especially for borders and for marking the lines of construction, is the guilloche or intersecting rope pattern. This is forthcoming nearly everywhere; sometimes as a border, sometimes following all the main dividing lines of the floor pattern, sometimes carried out as a diaper twisting all over the surface, as in one very ingeniously devised specimen in the cellar at the British Museum. It shows a want of invention that we should find such constant repetition of a pattern requiring so little thought; but it must be admitted that it always looks effective, and suits mosaic work very well. Another ornament which occasionally occurs affords another link between Roman and comparatively recent ornamental schools; for here and there among the designs among the Wollaston drawings, and in one or two of the original specimens at the British Museum, occurs that same form of radiating scolloped ornament, something like a fan, which became such a favourite in the late Renaissance period in England, though in the Roman examples it appears, of course, shaded, and not in relief. A very favourite ornament, in medallions and circles, consists of a kind of intertwined loop or knot forming a cross; this belongs to the same class of ornament as the guilloche, but is even more commonplace, and much less effective, and certainly not worth introducing as a central ornament in the circles of a large floor design, as it often is introduced. Perhaps the finest of all the designs in the Wollaston drawings of this class of detail, is the pavement found in Shropshire, and consisting of a geometrical design of intersecting squares forming each a star shape, with octagons enclosing circles in the interspaces: the whole of the lines being marked out by a broad and bold guilloche ornament following all the intricacies of the geometrical forms. This is one of the finest examples there could be of the effect of simple geometrical design and detail, without any suggestion from natural forms.

But in the use of design derived from nature, the Roman mosaicist, sometimes quaint, is sometimes also exceedingly grand and bold in his treatment. This is especially the case in some of the specimens from Carthage at the British Museum. Two of these may be especially noticed; one, apparently, an angle of a large floor, with a head in the corner which has been supposed to represent Spring. From this stretches diagonally into the floor space a symmetrical pile of leafage in warm tones, and on either side of it the space is filled up by grand scrolls of conventional foliage in the freest and finest style. Another from Carthage, almost equally fine in its way, shows how much individual variety of taste existed when these were made, for this latter one, in the next compartment of the "cellar," is in a totally different style; it is a central portion of a large pavement, without the border, and contains heads arranged in squares and circles at equal distances from one another, and the spaces between filled in with beautifully delicate spray and leafage in quite a different style from the foliage in the last-named example,—much more realistic and lighter and thinner in effect, but still quite suitable to its position. The effect of the whole over a large extent of flooring must have been beautiful, if we get over the unsuitability of having designs for heads in that position, where they must be seen upside down from one side of the apartment. The same kind of defect,—the design for a floor of what ought properly to be a vertical design,—characterises also what is, nevertheless, a very remarkable and interesting mosaic, drawn in Wollaston's collection, and of which a large fragment is in the British Museum; this is also a Carthage specimen, and represents rows of vases with intersecting arches rising out of them, on which birds are occasionally perched, and in one place a meandering bit of blue is introduced to represent a river, and two stags drink from it, while beside them is worked into the mosaic, with curious *naïveté*, the word "Fontes." Nothing else in the design is explained, and it is difficult to understand the whim which induced the designer to give this one stray marginal note in the middle of the work. Among the Wollaston drawings a few more may be drawn attention to as especially fine and interesting designs. One from Roxby, Lincolnshire, introducing Greek border patterns a good deal, is remarkable at the same time for the very Saracenic characters of the diapers. A specimen from Hadrian's Villa is interesting as showing in the angles that use of vases with conventional foliage growing out of them which became such a pet feature of Renaissance ornament. An example from Cotterstock, a panel with a vase in the middle of it, is, however, remarkable for a treatment quite different from what the Renaissance ornamentists took up; for here we have not a realistic representation, but a highly conventionalised indication of a vase, so cleverly done and in a style so suitable to the material, that it becomes quite an interesting bit of ornament. Another from Cotterstock shows a very fine and elaborate treatment of the Greek fret pattern, often, as we observed, poorly treated by Roman designers. A drawing of a pavement from Vienne, in France, in squares divided off by borders with double rows of lozenges, and filled in with geometric designs, is remarkable for its very mediæval character; in this respect it may be compared with one in the British Museum cellar, described by the Museum authorities as of "pomegranates, flowers, and leaves, arranged in cruciform patterns" (one of the Carthage mosaics), and which is singularly like mediæval ornament in general character and construction. Among the finest in the Wollaston set are two, copied from specimens in the Vatican Museum. One of these is a floor diaper in black and white, of wonderful elaboration, and certainly one of the finest and richest diaper designs ever seen; in the centre, a panel contains a fine silhouette figure of an eagle and hare, a subject found rather frequently in Roman ornament. Another magnificent design from the Vatican collection is a circular centre panel with a half-figure of Minerva, with angle spandrels filled in with silhouette figures and foliage in black on white ground.

Among the mosaics which are more or less pictorial, or which deal with human and animal figures, there is a great variety of merit. Mosaic pictures, in the strict sense of the term,—pictures with backgrounds and landscapes and perspectives,—are rare; the rarity being, we may be allowed to think, not so much owing to any instinctive æsthetic perception in the Roman mind of the unsuitability of such subjects for mosaic, as to the practical difficulty of carrying them out at all in the material. The South Kensington Museum possesses one specimen (also figured in the Wollaston drawings) of a farm-yard scene, and a man milking a goat in the middle of the picture, which is excellent in execution, and is probably as well done as anything of this kind could be done in mosaic, but the result only shows that it was a mistake to attempt it. Among the animal life shown in Roman mosaics it is noticeable that by far the best things are the birds and fishes. The Wollaston drawings include one from Sta. Maria in Trastevere, representing fowls stealing snails out of amphoræ, which is remarkably realistic and true; and the South Kensington Museum contains an original specimen showing cuttle-fish and a lobster with great success. There are some finer examples of the same kind in the British Museum, however, one especially from Carthage showing fruit and fish and baskets. It is remarkable that the representations of quadrupeds are universally bad in drawing, although almost invariably spirited in action. Considering how the Romans could carve quadrupeds in sculpture, it is curious to find such a great inferiority in power in mosaic, and leads to the conclusion that an inferior class of artists were employed in the latter, in many cases at least. The best quadruped figure we have met with is a horse drinking, in a specimen in the Wollaston drawings, from near Barcelona; a charioteer driving in a circus (from Lyons), among the drawings, shows great spirit in action, but the horses' legs are mere spindles. In the British Museum specimens the best are one or two figures of lions, in which there is a great deal of go and and a little more appearance of anatomical truth than in the horses. Among human figures there is the greatest possible difference in execution, depending, perhaps, partly upon date; but the dates of these works are in very few cases known, so it is matter for conjecture. There is a figure of Europa on the Bull in the British Museum, in which it is difficult to say whether the curious proportions of the lower limbs are due to ignorance of the figure or to an attempt (quite unsuccessful, in that case) to represent the sitting posture by foreshortening the upper part of the limbs. Some of the figures shown in the Wollaston drawings are, at least, however, much better than this one; and fine heads are frequently to be met with. Among these the colossal head of a marine deity, in the British Museum, the upper portion of which is unfortunately missing, is a grand specimen; in its bold conception, with the broad masses of seaweed clinging to the beard, it is a fine example of that power and largeness of style which characterise the genius of Roman art, even when we cannot but feel that refinement and true taste are wanting. It is to be hoped that this remarkably interesting collection of Romar remains, at present in the ill-lighted cellar of the British Museum, will, now that the new abode for the Natural History collection is ready, soon be brought up to the light of day, along with many other things of great interest, now almost out of sight and knowledge. A study of the mosaic specimens there, coupled with the Wollaston collection of drawings at South Kensington, will even now, however, enable any one who wishes it to form a very good idea of the variety of character, the quality of design, and the effect in execution of Roman work in this fine and enduring form of decorative art. This quality of endurance is well shown in the British Museum specimens. Mosaic may, unfortunately, be rather easily broken up, and when once a building is abandoned or neglected, the floors are likely to be disturbed sooner even than the walls. But of the portions that have been preserved whole, many are as fresh as ever, and might be laid down as parts of a new floor to-morrow.

THE HISTORY OF OLD ST. PAUL'S.

Two works, of considerable value for the light they shed around the history of Old St. Paul's, have just been written by Mr. W. Sparrow Simpson, D.D., F.S.A., Minor Canon, Librarian, Succentor, and Junior Cardinal in the Cathedral, and Honorary Librarian of the Archbishop of Canterbury. The first of them is entitled, "Chapters in the History of Old St. Paul's," published by E. Stock, Paternoster-row, in an elegant old-style octavo, of 300 pages; the other a monograph entitled "Some Early Drawings of Old St. Paul's," forming a paper in the current number of the Journal of the British Archæological Association. Taken together, these two literary productions comprise a large amount of research which has rewarded the author with a store of new facts concerning the imperfectly-known character of the old cathedral church, its fabric, and its historical surroundings.

The early history of religion in London is shrouded, just as of that in other places, in a mystery which may never now be unfolded. The recorded mission of Fagnus and Dumanus by Pope Eleutherius to King Lucius, of Britain, has, nevertheless, withdrawn into the dim region of Christian mythology, and almost the only relic which still survives to cast any light for us upon the religion of the pagan inhabitants of ancient London is the little altar of Diana, which was found on the site of Goldsmiths' Hall, where it is still preserved as the choicest ornament of the court-room of that wealthy guild. But if the conversion of King Lucius be nothing but a myth, there can be no doubt that Britain, half civilised, and a conquest to the Roman arms, gradually fell a conquest, in like manner, to the faith of Christ during the second and third centuries. The names, indeed, of some who who were bishops in England in the fourth and fifth centuries have been handed down, but criticism has not altogether accepted their claims. Much has been written concerning the pre-Augustine Church in Britain, but, after all, illogical conjectures and imperfect inferences form the bulk of such writings, and it is not until the closing years of the sixth century that we get a definite date from which to take our stand, and to calculate the accurate history and fasti of the English Church. Thus the year of our Lord 597, the date of the advent of Augustine, is followed by the building of the first church of St. Paul by King Ethelbert, and the consecration of Mellitus to be its bishop at the hands of Augustine himself. Where Mellitus established his cathedral, doubtless there now stands the majestic cathedral of the metropolis, but in those far-off days a prætorian camp of the Romans (perhaps itself occupying a site previously fortified as an earthwork by the earliest inhabitants of England), or a heathen sanctuary, surrounded by trees and shady woods, may have stood upon the Pauline hill. No records, however, remain to enlighten us upon these points.

Probably a simple structure of unhewn

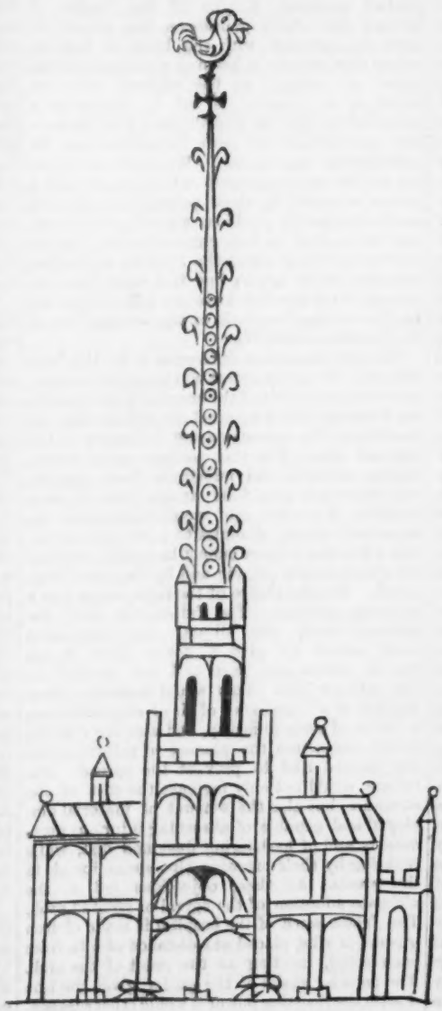
stones, like some of the earliest forms of edifices which still exist in Ireland, or a building of rough trunks, shaped by the axe, like that strange method of construction of which an example still remains at Greenstead, near Epping, and for which the suburban woods and forest would have supplied abundant materials, was the only edifice in which Mellitus and his little band of ecclesiastics chanted their services "where" now,—

"Through the long-drawn aisle and fretted vault,
The pealing anthem swells the note of praise."

Of Ethelbert's cathedral nothing whatever remains apparently, and nothing is known of it critically; future explorations may perhaps some day reveal a few relics of foundations which can be attributed to this age, but in the very nature of it any extensive excavation with a view to determine its site would be impossible. Fire, always the bitter enemy of St. Paul's, consumed the cathedral buildings in A.D. 961. But the edifice was restored in the same year. Again, on the 7th of July, A.D. 1087, a little manuscript in the British Museum, the "Chroniculi S. Pauli," records that "the church of St. Paul in London, and all things that were therein, together with great part of the city, were burnt with fire in the time of Maurice, Bishop of London." This second church was, in like manner, rapidly reconstructed. Again, in A.D. 1137, the cathedral fell a prey to the flames, according to the same manuscript, which relates that the fire on this occasion commenced at London Bridge, and extended as far as the church outside the bars of the New Temple of London. Nothing is known very accurately of the extent of the conflagration of 1137. Dugdale, following the generally trustworthy Matthew Paris, as quoted in Longman's "Three Cathedrals dedicated to St. Paul," places the date of this fire in A.D. 1136; Matthew of Westminster, another fair writer, places it a year earlier; and, as we have seen, the "Chroniculi" make the date a year later.

But the citizens of London loved their church too fondly to allow it to lie long in ruins. The work of rebuilding progressed under the fostering care of successive prelates and pious benefactors, and in due time the third church, that stately structure which is so familiar to us by means of Hollar's admirable etchings, arose, like a phœnix, upon the ashes of the second edifice, which had stood hardly half a century intact. When this was completed, there stood the cathedral church in its walled enclosure; to the north-west the bishop's palace; on the south-west the deanery; the greater cloister and the college-house of the minor canons on the north; on the south the lesser cloister, the chapter-house, the bakehouse, and the brewhouse. It was, without doubt, a grand sanctuary, full of all the details which went to compose a cathedral of those days, rich with many altars, shrines, images, and reliques; manuscripts of Holy Writ and ancient rituals; tombs of kings and saints; and well-worn places of famous pilgrimages. The lofty wall-mass of the lengthy nave with its twelve bays, of the choir with its equally numerous arches, and of the well-developed transepts, crowned by the delicate and lofty spire, higher than that of Salisbury, must have presented to the view a singularly impressive *coup-d'œil*. "Crowning," as Dr. Simpson writes, "the summit of the highest hill in the city of London, surrounded by the low houses of the dignified clergy and others, who dwelt under the shadow of the church, with broad gardens sweeping down the hill towards the river, the view could not fail to impress the spectator. There is, in fact, good evidence that its beauty was appreciated, and that those who gazed upon the magnificent building desired to record their impression of its grandeur."

A few drawings of this cathedral church remain in ancient manuscripts. The first we shall mention is a chronicle of the fourteenth century among the treasures of the Archbishop's library, at Lambeth Palace, where a marginal view of the cathedral, drawn with considerable attention to detail, is given in illustration of an account written by the chronicler respecting the taking down, in A.D. 1314, of the cross and ball, with great part of the campanile, because they were decayed and dangerous, and the erection of a new cross and ball, well gilt, and fortified with a collection of divers relics of saints, for the protection of the building. This was done on the 4th of the nones of October. The height of the whole is stated in this manuscript not to exceed 500 ft. The marginal sketch shows the great west doorway, the transepts very much compressed, an arcade of five arches running throughout the width of the building, the central tower, with four (here shown in elevation as two) pinnacles at the angles, and the lofty spire, with a large oblate, egg-shaped ball of large proportions, surmounted by a cross. The relics which were replaced in the gilded ball comprised a considerable variety of things, from a piece of the wood of the True Cross, to sundry bones of the 11,000 virgins of Cologne. They were exhibited to the congregation during a Sunday sermon, and afterwards carefully replaced in the ball, not without some sarcasm and scorn on the part of unbelievers, and were the subject of a special service of hallowing on the 6th of May, A.D. 1498, nearly 200 years afterwards. Architecturally, the spire, as drawn in the chronicle, is very curious. There is little doubt that the man who drew it intended to delineate, to the best of his ability, the main features of the actual building as a simple elevation. The exceeding height of the spire and the capacity of the ball greatly impressed the limner, who has depicted his impression of it in a very graphic manner.



Another illustration of St. Paul's Cathedral found by Dr. Simpson in the course of his investigations, and reproduced in the Journal of the British Archæological Association, comes from an early fourteenth-century chronicle of Rochester among the Cottonian manuscripts in the British Museum. Here, in the midst of roof-lines and pinnacles intended generally to represent our city (a description of the foundation of London being given in the text), stands the Cathedral church, drawn somewhat conventionally with arcades and gables, having an exceedingly lofty spire adorned with crockets and circular bosses, and surmounted by a cross and weathercock. In later years several notices are extant referring to the setting up of "the newe wethir cokke." From another manuscript of similar date among the royal collection in the British Museum, is derived a drawing of St. Paul's Cathedral in a very different style of treatment. This occurs also (like the last example) as an illustration to the account of the building of London. In the midst of the general view of London stands an elevated view of the cathedral as seen from the north or south, probably the latter, as there are two pinnacled towers, which appear to belong to the west front, to the left of the central tower. This tower also has pinnacles at its angles and

carries a tolerably high spire, and contains two stories of three long windows to each story. We are indebted to the British Archæological Association for the permission to use these illustrations.

Another view, a coloured drawing, probably the earliest picture in existence representing the City of London, is contained in a fine illuminated manuscript also in the invaluable royal collection in the British Museum. The delicacy of the lines, the charming colours, as brilliant as if freshly painted, the harmonious effect, the almost faultless perspective, and the happy manner in which the artist, a man evidently of no mean powers in his own art, has caught the spirit of the scene, combine to render this beautiful picture a perfect gem of the Mediæval Fine Arts, quite apart from the very great architectural and antiquarian value which it manifestly claims. The Tower of London, London Bridge, and many City churches may be easily distinguished in this picture; above all, in the very heart of the city, stands St. Paul's Cathedral with its central spire, and the way in which this catches the light is indicated very cleverly. Another illustration given by the author of these treatises, is a sketch of the temporary cappings placed upon the ruins of the cathedral after the fire which destroyed it on the 4th of June, 1561. This consumed the spire, and seriously injured the adjacent portions of the edifice, threatening at one time to extend beyond the fabric itself to the Bishop's palace.

The chapter devoted to the personal staff of the cathedral is of considerable usefulness to ecclesiologists, who may gain much information concerning the various dignitaries of the foundation, and their offices. Curiously enough, among the minor canons, twelve in number, were two cardinals, *Cardinales Chori*, an office not found in any other church in England. The duties belonging to their position are not very clearly defined. The chantry priests, a large body, were appointed not only to officiate at the special altars to which they were attached, but they had duties of attendance in choir. Chaucer alludes to the eagerness with which some of the county clergy, to the neglect of their own parishes, fought for chantries in St. Paul's. The ritual and religious services of the cathedral; the care, labour, and forethought required to feed the multitude who derived their sustenance from the cathedral revenues; and many of the aspects which present themselves to thoughtful men like Dr. Simpson, have been treated with care. Occasionally irregular forms of devotion sprang up in the cathedral for a time, like the strange popular devotion to Thomas of Lancaster, in whose honour a short "office," probably intended to be said at his tomb, and a more elaborate "office," with special anthems and hymns, were composed. The British Museum contains a metal plate used in the thirteenth century by the barber who shaved the crowns of the officers of St. Paul's, in order that all who took their tonsures from him might be of uniform cut. The rites of the boy-bishop, with the other usual and unusual

services, supply frequent themes for the pen of a careful writer; and in the chapters devoted to walks around St. Paul's, Dr. Simpson shows considerable knowledge of the topography of the cathedral precincts, and the numerous details which made up the cultus of St. Paul's Cathedral life in the Middle Ages. Notices of Wyclif and the stirring times in which he moved, his appearance before his judges in St. Paul's, in 1377, with the sequel of the tragedy in which the great Reformer played so prominent a part; the Lollards' Tower; the stocks in the dungeon of St. Paul's; the horrid tortures inflicted upon ecclesiastical and judicial prisoners by overbearing prelates and their bloodthirsty assistants; the miserable end of the desperate Peter Burchet, a murderer and apostate, in 1573, the last prisoner in the Lollards' Tower; these and many more episodes which combine to make up the individual and hitherto uncollected history of our metropolitan cathedral and its associations, must be sought for in the interesting volume we have before us.

Of the great fire of 1561, and the disastrous effects which it produced upon the sacred edifice, much has been recorded. Among the many conflagrations which have made havoc with the cathedral, this holds a prominent place. A rare tract, entitled "The True Report of the Burnyng of the Steple and Churche of Poules in London," which is preserved in the Library of the British Museum, and printed by Dr. Simpson, records the most circumstantial details of this calamity. John Stow, also, whose remains have furnished ample store of notes to all who patiently examine them, affords here much new information as to the result of the fire, "whiche was a lamentable syghte and pytyfull remembrance to all people that have ye feare of God before theyr eyes, consyderynge it was ye hous of owre Lord, erectyd to prays hym and pray to hym. ye beawty of ye syte of London, ye beawty of ye holle Reallme. A mynster of suche worthy, stronge, and costly buildynge, so large, so pleasant and delectable, not only of mynstyrs within thys realme, but ells where as sure as travayll hathe taughte ws in other realmes ethar Cristyn or hethyn." Paul's Cross and the doings of those who were its denizens furnish other store upon which a most readable chapter is founded, and the book concludes with a sketch of the fortunes of the cathedral during the *interregnum* and its troublous times, when the lopping of the revenues was planned and executed, when the Parliament treated the bishops and their clergy with high-handed dealings, drove out the prebendaries, and replaced them with trimmers and place-hunters, dispersed the plate, stopped the necessary repairs, suspended the works, and allowed desolation and desecration to work their natural way with all that had been rich and beautiful and sacred hitherto. Eloquent words, which will bear quotation, ring upon our ears as we close Dr. Simpson's book. They will bear quotation here:—"Many another grand cathedral had the same sad tale to tell; the same wearisome story of pluralities and non-residence, of overwhelming greediness and self-seeking, of rampant nepotism, of desecrated naves, and of deserted choirs; of dignitaries receiving great revenues and rendering no service in return,—of cold hearts. The way was paved for still greater desecrations, and they came. Horses neighed in the canons' stalls; and Dr. Cornelius Burges, with his twenty thousand pounds of plunder, preached in the ruined choir. We may not conclude with words of sadness. Nor is there need. The renewed life of the cathedrals is one of the most striking features of the great religious revival of our day. St. Paul's has abundantly shared in that regeneration, and let the reverent thousands gathered in its vast area, its long-drawn nave, its spacious transepts, filling every part, silent, listening eagerly, last dedication festival to the grand music of Mendelssohn's 'St. Paul,' remind us that the cathedral is something more than 'a petrifaction of religion.'" Works like these, which we have brought before our readers on this occasion, are not without their use in fostering the reverential feelings we should all exhibit towards so historic a pile as the cathedral of St. Paul.

The Plane Tree at South Kensington Museum.—Mr. Smiles pleads for the preservation of "the magnificent plane-tree in front of the old entrance-door of the South Kensington Museum," which, he says, is about to be sacrificed to make room for certain new buildings.

THE NEW FRENCH SYSTEM FOR THE CONSTRUCTION OF HOSPITALS.

THE effort to substitute small isolated structures as hospitals for the monumental buildings of the past, has at last received in France practical sanction as well as theoretical support. In spite of the antagonism of private interests and the force of routine, the new system has been adopted for military and civil purposes at St. Denis, at Courbevoie, by the Paris Muncipal Council, by the Eighth Army Corps at Bourges, at Autun, at Cosne, Macon, Montpellier, &c. The idea of isolated small structures of only one story instead of large hospitals was first advocated in France by M. Le Roy, in a paper submitted to the Royal Academy of Sciences in 1777. The first application on a large scale of this principle was during the Crimean War, when in some instances the patients were separated as much as possible. The experiences during the war of Secession and during the Franco-Prussian War clearly demonstrated the advantage of tent and cottage hospitals. The deaths after surgical operations in these hospitals during the American War amounted to 34 per cent., while during the Crimean War in the old-fashioned hospitals the French lost 74·8 per cent. of the soldiers who had undergone surgical operations.

The method of construction which is now generally adopted in France, wherever the new principle is admitted, is known as the système Tollet, and was patented by M. Tollet, a distinguished engineer, Knight of the Legion of Honour, &c. This gentlemen has sought to build in harmony with the laws of hygiene rather than merely in keeping with some special school of design; he has realised that the object of a hospital is not to ornament a town, but to cure its inhabitants; that its sanitary qualities are far more important than its monumental appearance. We need not trace the well-known arguments which would lead a person actuated by these principles to propose small cottages or pavilions standing well apart and surrounded by free currents of air, for the re-introduction of which the *Builder*, in the first instance, did so much; but it is essential to inquire in what the Tollet system differs from the English cottage hospitals or the wooden huts of the American Civil War.

The first important difference is in the form adopted. The great object was to expose as large a surface as possible of the hospital to the purifying influence of the external air, and as little as possible to the contaminating influence of the internal air. For this purpose cross-beams, angles, ceilings, and numerous floors, garrets, and staircases should be avoided where practicable. A vaulted roof would not present the same multiplicity of angles as a flat roof or ceiling, where the corners cannot be readily reached by the currents of air and by the scrubbing-brush. But the choice of the right curve was a puzzling problem. The full-centre arch, the circular arch, the ellipse, the depressed arch, would all give a curve that is too flat in the upper part and too vertical in the inferior half. This would make the introduction of a "matlass" of air of even thickness a matter of some difficulty, and also the traction would necessitate the placing of rafters across the vaulted roof to prevent the spread. But rafters would not only increase the cost of the structure, but also the amount of material employed and capable of absorbing injurious emanations and of harbouring dust and dirt, while reducing by their presence the space for air in the wards. All these objections led to the ultimate adoption of the ogival or pointed arch. The frame-work of the hospital is made of iron girders or ribs, placed at a distance of 4 ft. from each other, meeting at the point of the arch. The peculiar shape of the girder gives the iron double the resisting power it would otherwise possess; and, this being the case, it does not matter of what substance the wall is made, so far as its durability, or rather its strength, is concerned. For field ambulances the intervening space is filled up with wooden planks, which can be burnt each time there is a change of quarters, thus reducing the chances of infection and the weight of the materials to follow in the wake of the army, both these advantages being of the greatest importance.

Where the hospital is to be of a more permanent character, bricks or stones are used. The most important hospital of this description is that of Bourges, which holds 220 beds. It is situated on a gentle slope, and covers six hectares and fifty ares of ground (about fifteen acres). This is equivalent to 2,582 square feet of land per bed, whereas the new Hôtel Dieu of Paris will only give 386 square feet of land per bed if it is to hold 600 beds, and 290 square ft. if the full complement is to be 800 beds. The Bourges Hospital consists of twelve one-floor ogival pavilions erected at a distance of 52 ft. from each other, the principle being that the intervening space of open air or garden should be twice as wide as the structures are high. These pavilions are divided into two rows, and the garden separating the one row from the other is about 164 ft. wide, while the amphitheatre, dead-house, &c., are erected at a still greater distance. The pavilions measure 120 ft. in length by 26 ft. in width, and are raised about 5 ft. above the earth. They contain twenty-eight beds, nearly 4 ft. being allowed between each bed, and more than 9 ft. between the two rows of beds. Altogether each individual has 57 cubic mètres of space, though in the American hospitals the space allowed barely exceeded 40 cubic mètres, and 27 cubic mètres were considered the minimum.

The outer surface of the wall of this structure is allowed to retain its porous character, as pure air only plays upon it. Between the vaulted roof and the outside covering of tiles there is a "matlass" of air 8 in. wide, and the bricks employed for the wall are perforated, so that a current of air passing within the wall excludes the damp and modifies the excess of cold or of heat. The inner surface of the wall is covered with silicate, so that it is rendered smooth and non-porous; it can, therefore, be washed with an antiseptic solution, or, better still, it may be daubed over with petroleum and scorched by its flame. The building is made exclusively of non-combustible materials, and vapours condense on the walls, run down the side, but do not sink into the pores, where the organic matter is prone to ferment. The floor at Bourges is made according to the Gourguechon patent, of wood thoroughly covered with a bituminous substance, so that the hospital dust cannot sink in,—an important consideration when we remember that this dust has sometimes been found on analysis to contain 34 per cent. of organic matter.

One of the leading advantages of the ogival form is the facility it affords for the complete ventilation of the hospital. In winter the warmed air naturally rises to the point of the arched roof, where there is a ridge that can be opened running along the entire length of the pavilion, and communicating with cowls placed at short distances one from the other, which draw off the air when the ridges are closed. There are numerous large windows on both sides of the pavilion, and above them small louvre windows, that can be readily opened by a rope. The doors at each end of the pavilion are surmounted by a rosace, that helps to ventilate in a longitudinal direction whenever the course pursued by the wind renders lateral ventilation not so advantageous. The ridge at the point of the arch is 4 in. broad, runs the whole length of the building, and is divided into sections of about 15 ft. each. One or all of these sections can be opened by means of ropes, thus allowing an outlet for the vitiated air at the apex of the arch, where it would naturally ascend. The air is admitted by small apertures pierced both below the beds and at some elevation above them, and is drawn in by the heat of the stove in winter. A space of 5 ft. underneath the floor of the pavilion also admits of all manner of experiments in respect of ventilation, as here the air can be collected, cooled or warmed, moisture added, or it can be charged with medicated vapours.

At the end of the pavilion, facing the entrance, there is a door that communicates with a little annexe, which is severed from the main building by a covered passage, open on both sides, and about 9 ft. long. Here are the closets, communicating with a tub placed in the open air immediately below. The sides of the tub are provided with a spongy substance, soaked with a disinfectant, so that the matter received is at once purified. Near to the tub, and also in the open air, under this annexe, is a little cart, which receives from above the soiled linen, so that it is at once removed from within the walls of the hospital. The main building, or pavilion, apart from the dormitory with its twenty-eight beds, contains on each side, on entering, a small separate room, the one for the nurse, the second for any patient it might be desirable to keep isolated. At the other end of the ward there is a small dining or sitting-room, a bath-room, and a small kitchen for making poultices, &c. Such is the Tollet Hospital at Bourges. Each of the

pavilions is like its neighbour, excepting the pavilion not built for the patients, but for the administration offices, pharmacy, kitchen, &c. With some slight modifications the same system has been adopted throughout. There now remains to be seen what sanitary and financial advantages have been achieved.

It is easy to perceive that the main features of the Tollet system are susceptible of a very wide application. There is even a Swedish church built in Paris according to these principles, and its application for stables naturally suggests itself. There are Tollet stables for the French cavalry, but the new method of construction has been most extensively applied in the building of barracks. The sanitary results realised by the Tollet barracks will explain their great popularity. At Bourges there are barracks on the Tollet system for 1,471 men of the 37th regiment of artillery, where the mortality amounted to 7·6 per 1,000 in 1876, instead of 11·88 per 1,000, the average mortality of this branch of the service during the year in question. In 1877 the deaths were 5·43 for the Tollet barracks, and 10·50 for the other artillery barracks. At Bourges in 1876, there were 468 cases of illness per 1,000 artillerymen, and in 1877 only 428, whereas the proportions per 1,000 for the two years in the other barracks were 552 and 506 per 1,000. At Autun, there are infantry barracks on the Tollet system for 844 men, and at Cosne for 745 infantry. In 1876, the average illness of the French infantry amounted to 528 cases per 1,000 soldiers, but this was reduced at Autun to 136 cases, and at Cosne to the singularly small number of 22 cases per 1,000. During the following year the average sickness of the infantry amounted to 482 cases per 1,000, but at Autun there were only 111 cases per 1,000, and at Cosne 71 per 1,000, and no deaths at either place. Of course it is unfortunate that as yet we have only statistics for two years, still they are sufficiently emphatic to leave but little room for doubt as to the good achieved; nor had any case of typhoid fever occurred in any of the Tollet barracks, though this disease has been very prevalent among the French troops; indeed, the 95th regiment of the line was recently quartered at Bourges, one battalion in the old-fashioned barracks of St. Sulpice, another in the barracks du Grand Séminaire, and the two remaining battalions in the new pavilion or Tollet barracks of Sérancourt. In a short time typhoid fever broke out in both the old barracks; there were thirty cases, and no fewer than eighteen deaths. The twenty pavilions of the Tollet system were within a hundred paces of one of the old barracks, and the soldiers who inhabited them were of the same regiment, and yet not a single case of typhoid occurred among these men!

With respect to diseases of the respiratory organs, the statistics are equally satisfactory. During the two years 1876-77, the number of cases were only equal to 20 per 1,000 at Bourges, Cosne, and Autun, whereas at Dijon and Nevers, where the climatic influences are the same, the proportion was 40 in the 1,000. The diseases of the respiratory organs are most frequent among the regiments quartered in the high lands of the Rhone, the Alps, the Dauphiné, and Savoy. In these districts the statistics show 54 cases per 1,000. With the 13th Army Corps in Auvergne, the figures are also 54 per 1,000; with the 11th Corps in Brittany, 50 per 1,000; with the 12th Corps in Limousin, 50 per 1,000. The minimum is with the 17th Corps, namely, 31 per 1,000, and the 8th Corps, occupying the Bourges district, 32 per 1,000; while in the Tollet barracks the proportion is, we repeat, 20 per 1,000. These few figures will suffice to show what important results have been attained, though much more might be said on the subject.

While the reform in the construction of hospitals and barracks has thus ensured a great saving in the life and health of the French soldier, it has been equally beneficent to the pocket of the French taxpayer. The hospital at Bourges was designed for 320 patients, and would have cost 112*l.* per bed. But when the works had begun, the scheme was altered, and the number of beds reduced to 220; this caused a considerable increase in the proportionate expense, and the hospital actually cost 144*l.* per bed. The cheapest French hospital is estimated at 180*l.* per bed, with 40 instead of 57 cubic mètres of space for each patient; but the cost per bed amounted at Lariboisière to 720*l.*, at Ménilmontant to 640*l.*, and at the Hôtel Dieu to the fabulous price of 2,400*l.*! In the construction of barracks, according to the new system, we are promised an economy of, at least, about 30 per cent.

Under these circumstances it is not surprising that the proposed reforms should have found many warm advocates, and achieved some notable theoretical as well as practical successes. The most recent achievement has been the conversion of the Paris Municipal Council. The necessity of increased hospital accommodation in Paris has long been felt, and the Municipal Council have finally voted a sum of 17,600*l.* for the construction of a hospital according to the Tollet method at St. Ouen. The municipalities of Courbevoie and St. Denis, near Paris, are now constructing hospitals according to the same system. Havre has a similar project in consideration. At Montpellier it was decided to abandon the old central hospital where the *clinique* of the university was held, and to build a Tollet hospital in the outskirts of the town. The same system has been adopted for the engineer barracks at the fort of Cormeilles, for the cavalry and infantry at Macon, for the artillery at the fort of Langres, &c.

Abroad the Tollet system has been adopted for the Austrian army, and almost every European power has sent special commissioners to visit Bourges and report on the innovation. In this respect, the Danes and the Russians have been particularly active. The Grand Duke Constantine, in person, conducted the inquiry, and has had many lengthy interviews with M. Tollet. The time has, therefore, come when English sanitary reformers should take further note of what is occurring among our neighbours in this very intricate and important question.*

ABSTRACT OF THE CENSUS LAID BEFORE PARLIAMENT.

THE preliminary Abstract of the Census, of which we gave our readers some forecast in a recent number, has been laid before Parliament. In our notices of any statistical papers which so directly affect the prospect of the trades connected with building, it is our object to present our readers with such deductions as we may ourselves work out, as likely to be of value from the *Builder's* point of view, rather than to repeat those details which are to be found in the daily papers. The form in which a statistical paper is presented to Parliament naturally determines, for the most part, the tone and bearing of the remarks which it elicits from the press. When the report is crude and raw, remarks are vague and general. In the present case the Registrar-General has himself provided an analysis of his report, giving ratios and percentages, and enriching, or at least augmenting, the English language by a new word to express the relation of area to population. At all events, we do not find the word "areality" in the English dictionary.

The sum total of the great addition may be conveniently regarded under the following heads:—

	1881.	Per cent.	1871.
England and Wales.....	25,968,286	... 73·78	... 22,702,266
Scotland.....	3,734,370	... 10·60	... 3,360,378
Ireland	5,159,839	... 14·60*	... 5,412,377
Islands.....	141,223	... ·50	... —
Army and Navy abroad	242,844	... ·70	... —
Total	35,246,562	...	... 31,845,379

* Decrease.

As to the distribution of this large number of human beings, with regard to the area of land in the several main divisions above indicated, it may be convenient, first, to state the acreage. This we have given at

	Acres.
England.....	32,590,397
Wales.....	4,734,486
Scotland.....	19,639,377
Ireland	20,322,641
United Kingdom.....	77,286,901

The proportion between population and area is calculated in two ways. The simplest of these, as dealing with the roundest numbers, is stated in units of population per square mile of country. The other method, which the Registrar-General describes by the word "areality," is stated in yards, or acres and fractions of an acre, per unit. The density of the population of England and Wales is now about 440 persons to the square mile, or ·625 to the statute acre. At the census of 1871 the density was, according to the Registrar-General, 390 persons per square mile (our own figures give 384); the increase on the decade being at the rate of 50 persons per square mile, or 12·83 per cent. The "areality," also given by the Registrar-General, was 19,934 square yards to each person in 1801; 7,928 square yards to each person in 1871, and 6,955 square yards, or 1·437 acres, to each person in 1881. With this increase of density (not for the United Kingdom, of which we spoke on a previous occasion, but) for England and Wales, has to be contrasted the decrease of density in Ireland, from 258 souls per square mile in 1841, and from 174 souls per mile in 1871, to 162 souls per square mile in 1881.

With regard to the primary division of the population, namely, that according to sex, if we confine ourselves to proportions per cent., they will be found to be 51 per cent. of females, to 49 per cent. of males, the proportion being the same for the United Kingdom, and for England and Wales. This shows an increase in the proportionate number of females since the beginning of the century, when the ratio was 50·6 females to 49·4 males. The difference is not very large; but it is deserving of remark as connected with the recent movement made as to female education and employment. Moreover, in dealing with such large numbers, the transfer of even four *per mille* from one side of the account to the other shows an additional preponderance of females over males, as compared to the ratio existing in 1801, of more than 280,000 souls.

The Registrar-General has given the percentage increases during the century, in the same manner as that in which, in a previous article, we ourselves had calculated them for London alone. They are as follow:—

	Per cent.
1801 to 1811	13·99
1811 to 1821	14·93
1821 to 1831	14·67
1831 to 1841	10·09
1841 to 1851	2·54
1851 to 1861	5·72
1861 to 1871	8·62
1871 to 1881	10·68

Thus as far as the ratio of increase on the population can be taken as a test of prosperity, the country is now in the same condition as in the decade 1831 to 1841. It should be remarked, however, that it was in this decade that the railway system was introduced. The effects could hardly be distinctly perceived by 1841; but by 1845 the great prosperity of the earliest lines had produced the well-remembered railway mania. In spite of the stimulus thus given to the productive force of the country, we find, however, that this very decade was marked by the lowest rate of increase during the century. This fact has to be looked in the face. It is not alone among these data which serve to show that marriages, or, at all events, prolific unions, do not increase with the increase of the material prosperity of a country. We are not offering any opinion on that vexed question. But we call serious attention to the comparision above indicated. It is a remarkable coincidence that on the very day on which the above lines were written, a telegram from Berlin in a morning paper says,—"The authorities, who have been considering the cause of the decline of commerce and industry, are inclined to attribute it to over-population, which is becoming manifest at an alarming rate, and is entirely out of proportion to the augmentation of agricultural products." The subject is one of the highest social interest, and is one on which hasty generalisation, from insufficient data, is mischievous. When we contrast the two most densely-populated English counties, viz., extra-metropolitan Middlesex, with 1,364 souls to the square mile, and Lancashire, with 1,707 souls per square mile, hives of industry and cradles of wealth, with the 162 souls per square mile of Ireland,—the word over-population has a curious inconsistency. Important as the proportion between the agricultural produce of a district and the population which inhabits it must be, it is evident that it cannot be regarded alone as a measure of the proper distribution of population. As to that, indeed, the controlling feature must be the military or naval *status* of the district in question, or the ability of the people in time of war to command the uninterrupted access of such supplies of food as they desire from abroad. Bristling as the world is with arms, while the dull sound of cannon is now echoing from the shores of the Mediterranean, there is only too much reason for reflecting with anxiety on the foregoing consideration. A dense and a rapidly-increasing popula-

* In connexion with this subject reference may be made to our illustrated account of the Sturges Pavilion, Belle Vue Hospital, New York,—vol. xl., p. 68, &c.

tion is a feature of which the value depends upon the co-efficient,—to borrow a metaphor from algebra. With wisely-directed industry, every fresh arm added to the army of labour is a source of natural wealth. In the absence of wisely-directed industry we have to regard, not so much the increased number of arms, as the increased number of mouths. When a man cannot do something more than feed two and a half human beings by his labour, human beings are, economically regarded, but noxious weeds. When he can and does endeavour to feed four, six, ten, or more of his fellows, every man is like a ripe ear of corn added to a well-filled sheaf.

SANITARY AND SOCIAL ASPECT AND PROSPECT IN DUBLIN.

IN continuation of our notes on some of the sanitary, social, and other aspects of Dublin, let us observe here that our views are not the result of impressions from hurried visits through the city and environs, but of repeated inspection and inquiry in each locality. Progress or decay in the life of a city, to estimate it aright, needs a retrospective as well as a present survey. It needs also that the investigator should have some previous personal knowledge of the places and habits he describes extending over a number of years, so that he may draw just comparisons. Antecedent labour in the above direction, we believe, entitles us to speak: so we will proceed with our notes. In almost every quarter of the city proper, large areas are met with characterised by visible evidences of decay,—dilapidation in respect of buildings, uncleansed and badly-cared for streets, indigence among the industrial classes through scant employment, and a desperate struggle for life among large numbers of the small shopkeeping class. This decay is creeping on like a cancer, and it is now skirting and hedging in the very Viceregal and municipal centres of the city, affording a sad contrast with the pictures presented by those parts of the city fifty years ago, or even less. Castle-street, adjoining the Castle of Dublin, the Lord Lieutenant's official residence, for two centuries was one of the chief commercial centres of Dublin. Indeed, from the days of Charles II. down to the end of the first half of the present century, Castle-street maintained its importance, and ranked at the head of the old streets of the city on the south side of the Liffey. Since about 1850 this locality has been going down; its wealthy traders deserted it years ago, and most of the houses and shops are in a ruinous condition. If we were to plant the Mansion House of London, the Royal Exchange, and the Bank of England in the middle of the old Seven Dials or Drury-lane quarter, the contrast would be scarcely more marked than that presented by the picture of some of the surroundings of the Castle of Dublin to-day, as compared with its position forty years ago. Dame-street, leading direct from Trinity College to the Castle, still, to a great extent, maintains its importance as a great artery, and has many good buildings; but as it approaches nearer to the City Hall (formerly the Royal Exchange of Dublin) and the Castle, the appearance of several of its old brick buildings spells decay. Parliament-street, too, a comparatively modern street, facing the old Royal Exchange, and leading up Cork-hill to the viceregal centre, is evidencing a marked decay in the appearance of its houses and shops, compared with what was apparent some years ago. We particularly noted the streets named, because for many years those and others leading directly from them have been looked upon as comprising the most wealthy and stirring business portion of the city. Decay at the extremities of a city, like disease at the extremities of the human body, may be arrested by timely remedies; but when disease begins to encroach on a central and vital spot, there is reason to feel alarmed. Municipally, Dublin for many years lacked skilful and intelligent treatment in an improving and sanitary direction. Her black spots were ignored and persistently neglected, till the sores and ulcers of her lower social strata reached her most central and vital parts, spreading by what they fed upon. Thus, in Dublin, tenemental life and living are surging around the most fashionable portions of the city, and threaten to absorb the few remaining haunts of wealth and private and public importance. Reconstruction is a part of the yearly work of every modern city; but in all well-governed cities the work of renewal or improvement need only be carried out by instalments. Unfortunately, in Dublin the measure of her wants is great, for by long-continued neglect wholesale demolitions are at present necessary, and large measures of improvement, building and sanitary, should follow in their wake. That such measures of improvement are requisite for Dublin we believe her own sanitary authorities will not deny; but we are not sanguine that any great scheme of public improvement will be carried out in the Irish capital within a reasonable time. The corporation is constantly pleading a want of funds, and no doubt with a larger income it could do more; but it has not hitherto wisely or economically used the income arising from the city estate nor the loans obtained through its borrowing powers. By the falling in of leases, as well as through other changes, the municipal income is becoming yearly more large, but small measures of improvement are counteracted in their effect in Dublin by the steady growth of large areas of poverty and decay, and the ills incidental thereto. The annexation of the immediate township suburban districts north and particularly south of the city, now ruled by distinct local boards, is now desired by the Corporation. A large number of the inhabitants of the suburban townships derive their income, of course, through city business, shops, offices, and appointments. It is considered that the township residents derive all the advantages belonging to the city, but contribute little or nothing towards its maintenance by contributing to the rates, &c. The municipal body calculate that by the absorption of the townships and the necessary extension of the municipal boundary, it will be then enabled, through its greatly increased income, to carry out those large measures of sanitary and town improvements which Dublin needs and which cannot be attempted under the present financial circumstances of the Corporation. A Boundary Commission sat in Dublin not many weeks since, and after hearing a lot of evidence on the part of the Corporation and the opposing boards, declared in favour of the annexation of the immediate townships. This, of course, strengthens the action of the Corporation, but considerable work need be done yet before the annexation scheme can be carried out. A more widely extended municipal boundary means a larger city, considerably more work, and many new appointments, and their sequence, much greater expenditure. If the Corporation of Dublin succeeds, we hope, for the sake of the public health and the other sanitary and urgent wants of the city, it may prove worthy of its trust, but with the present glaring defects of its constitution and administration before us we, have our misgivings.

That the Corporation are entitled of late to praise for some useful work done in a building and sanitary direction we will not deny; but when all is stated, it is miserably small in view of the wants of the city. Among recent works the rebuilding and widening of Carlisle Bridge is a decided improvement, though long delayed. The new swivel bridge lower down over the Liffey is also a great acquisition, but the Port and Docks Board played the chief part in carrying out these very efficiently-executed works, which it is but justice to say reflect credit on the contractor employed. On the south side the new swivel bridge requires a wide approach to afford better facilities for the vehicular traffic. A new and wide street is contemplated, and is positively needed, and it should be made as a continuation of College-street, crossing the end of Townsend-street, and then curving gradually round to a straight approach to the new bridge. Between the lines of Great Brunswick-street and George's and Sir John Rogerson's Quays, there is a large area of ruinous and unsanitary dwellings, narrow and badly-kept streets and courts, much uncleanliness, and an absence of wholesome ventilation. Opening-up is badly needed in the locality, and this can be accomplished by the demolition of a description of tenemental houses that should have been improved off the face of the earth years ago. This work of improvement might be carried out by instalments, and immediately follow the opening of the approach to the new bridge, which will cut across the end of the neglected locality we have indicated.

One of the most marked improvements effected within recent years in Dublin is the work carried out by the Dublin Port and Docks Board, in deepening the navigable channel of the river and harbour, reconstructing the quay walls in the shipping portion of the Liffey, and extending the line of the North Wall quay a considerable distance seaward. The latter work is still proceeding. More and better dock accommodation is also being provided at the end of the North Wall. Large sailing-vessels and cross channel steamers can now come and go independent of the tides. With the improvements now being effected in the river and harbour, we may soon expect to see the Royal Mail steamers running directly up to the quays of Dublin instead of to Kingstown harbour. The change would expedite the service.

Street and other subsidiary improvements in the city proper move at a painfully and depressingly slow pace. New streets projected by the Old Wide Street Commissioners, before that body was dissolved upwards of forty years ago, are still unopened. The Wide Street Commissioners, during their existence, carried out several notable public improvements in Dublin in an efficient manner, but the "Reformed" Municipal body, which succeeded to the duties of the former body, have not signalised their tenure of office by any street improvements or opening-up within the city worth speaking of. The new street for opening up Cork-hill and Castle-street to Christ Church Cathedral, lately restored, though urgently needed, has been hanging fire these twenty years, to the great scandal of the city. We marvel much the Irish Executive has not taken some steps to expedite the improvement, for, as we have already remarked, the ruin and wretchedness that exist under the very shadow of the Castle are of a very marked character, and present a very uncomfortable background to the viceregal centre. A new street in continuation of York-street to St. Patrick's Cathedral was contemplated sixty years since, but was never carried out. With the improvement of St. Stephen's-green completed a few months since by the liberality of Lord Ardilaun (late Sir Arthur Guinness), the opening of this new street leading direct from the green to the cathedral would be a decided acquisition to the city, and a great benefit to the interests of the cathedral. The opening up of several districts in the old quarters of the south side of the city, and in the north-western old quarters north of the Liffey, is absolutely needed for the health of the inhabitants and as a judicious step in arresting the progress of rapid decay going on in those parts of the town. We regret to note that St. Patrick's Cathedral, which was restored about sixteen years since by the munificence of Lord Ardilaun's father (Sir Benjamin Lee Guinness), is suffering already and in a serious way from damp and rot. The floor of the church is very low, and much under the level of the street without; and, to make matters worse, the bed of the old Poddle River (now and for long years a covered-over and elongated sewer) passes under it in close proximity to the walls of the cathedral. As no special funds exist for providing for the repairs that are now needed, a public appeal has been made.

As regards the drainage and sewerage of Dublin, many defects are still unremedied. The Corporation within recent years constructed by instalments several miles of new sewers, but many more are needed, and long lengths of those recently constructed are very defective in junction and gradient. The old stone house-drains in Dublin in general are wretchedly bad; many act and many more do not. Some of these house-drains directly enter the street sewer unprovided with any kind of trap, and in streets where the house-drains are trapped it will be found the traps are very defective, faulty in construction, or out of repair. In fact, in thousands of the houses of Dublin there is a direct communication between the interior of the house and the street sewers, and the gases may be sucked or circulated backward and forward as draught, temperature, or other circumstances accommodate. The latest complement of sewer work carried out by the Corporation a few months ago has been already the subject of two inquiries and reports as to alleged defects and scamped workmanship. Several defects have been proved, others have not been proved. The old system of privies and ashpits or cesspools still obtains in Dublin to a very large extent, and their state in connexion with tenement-houses is truly deplorable and sickening. The old tenement-houses have mostly large and open ashpits communicating with the privies. Being uncovered, they receive the rain, and are otherwise acted upon by the heat in warm weather, resulting in dangerous effluvia. The sanitary authorities are endeavouring to lead to

the substitution of water-closets, and in some quarters have succeeded. Until an entire change of system takes place, ill health and other evils will be inseparable from these old tenemental dwellings. In the meantime, the old ashpits should be reduced in size, and enclosed. Frequent cleaning is a necessity, but where large ashpits and cesspools exist the cleansing is at long intervals, thereby adding to the danger that necessarily accompanies filthy surroundings. The street scavenging of Dublin is very limited and imperfect in its range, and no regular system of domestic scavenging at all exists, though such a system has been long in contemplation by the Corporation. The refuse receptacles of the houses of the poor, and their back-yards, with the lanes and courts where they reside in large numbers, should be cleaned often, and the latter daily. The subsoil of large areas of Dublin, covered by tenemental houses, is saturated by leakage and percolation, and has been so for long years. Health and a low death-rate are impossible under such conditions as we have described. The Liffey purification and a judicious system of main drainage suited to the circumstances of the city are still in abeyance, and little progress seems to be made in expediting the beginning of the necessary works.

We long since indicated what ought to be done. If the sewage of the city is not utilised for irrigation, reclamation, and agricultural purposes, but sent out to sea, much valuable fertilising material will be lost. If it be sent out to sea, there seems to us to be only one practical and efficient plan for an outfall whereby the sewage could be got rid off without the danger of its drifting back again in part into the harbour and river. For the north city and suburbs the outfall should be outside the Head of Howth, and for the south city and environs the outfall should be outside Dalkey Head. These two outfalls, of course, will necessitate long lines of outfall sewers, but the suburban townships on either side of the bay are extending rapidly, and their wants and the wants of the future will need to be provided for. It is manifestly clear that the sewage of Dublin cannot be poured into the harbour; and as it cannot, the other plan must be adopted if safety and efficiency are to be secured.

The building trade and cognate industries have not been brisk of late in Dublin, though a limited number of suburban villas are being erected in the northern and southern suburbs. Want of employment is apparent in various trades. The Corporation is erecting a public abattoir in the north-western end of the city, and it is to be hoped that the sanitary authorities will compel the butchers to use this necessary building, for the majority of the present private slaughter-houses are a positive disgrace and danger to the city. Another abattoir will be needed for the south side of the city. The cost of the new abattoir is estimated at 15,000*l*. The approach to the new swivel bridge on the south side on the plan intended by the Corporation is put down at 20,000*l*. If the very old and wretched dwellings we previously alluded to in the vicinity of the new swivel bridge are cleared away in opening the new approach, the improvement will be a real one. An improvement has lately taken place in the condition of the dairy-yards of the city by a system of supervision; but much remains to be accomplished before the dairies, cow-sheds, and milk-shops of Dublin can stand the test of a fair inspection. Public baths and washhouses have long been needed, and a loan is being sought by the Corporation for providing some. The old markets of Dublin have long become unfit, both structurally and on sanitary grounds. Indeed, the butchers deserted some of them years ago, and spread themselves over the city, many of them converting their back-yards into slaughter-houses. An extensive new market has just been completed in South Great Georges-street, called the South City Market, erected by a public company. To all appearance, it is suited for its purpose; but whether the public will take to it, so that it may prove a success, it is difficult to say. The old city or parochial graveyards in connexion with the churches are in most instances demoralising pictures of unchristian and unsanitary neglect. In summer they are pathless with rank vegetation, and in winter dismal with decay and rottenness. Surely several of them with little cost could be converted into ornamental gardens and health-spaces for the poor populations that surround most of them. The weak point of municipal administration in Dublin is procrastination and the want of decision. The Corporation has secured several useful Acts, and issued from time to time a number of unexceptionable rules and regulations; but, alas! it has not enforced them for various reasons well known to itself and others. Its recently-confirmed "Building By-laws and Regulations" are already almost a dead letter, and thus speculative building irregularities are rife, and some of the wrong-doers are members of the Public Health Committee. In other directions the same fatal policy is pursued by the municipal body. The sanitary defects of Dublin are many, and her wants great, but we could not cover them all in a paper or two. We have endeavoured to truthfully describe the aspects of the city as we found them and as they exist at the present hour. If much drunkenness, poverty, and crime is evidenced, a large amount of it may be truly put down to the wretched state of the homes of the people. Long years of sanitary and other neglect have borne their fruits, and the dismal harvest is being reaped in a continuously and abnormally high death-rate, and the chronic ills that doom a large number of the poorest of the population to vegetate or drag out their lives in a kind of living death.

A FRENCH CRITIC ON ENGLISH ARTISTS.

FEW French art-critics who have expressed their opinion of foreign—especially of English—art, have been in the habit of exercising the complimentary tone for which Frenchmen in the old days were proverbially famous, and it has very often happened that the expression has been so mixed up with evidence of want of care in obtaining a knowledge of the simple facts, that those who have read their remarks have scarcely regarded them as worth any serious attention. Some years ago, however slightly English artists were acquainted with French art, French artists were altogether unacquainted with, and not in the smallest degree anxious to know anything of, English art; but, of late years, a very different feeling has existed both in England and France, and especially with the landscape-painters the story has been often told how much French landscapists have learnt from our great English masters. We have not unfrequently had occasion to smile at the complacent criticisms of French visitors to our London exhibitions. It is not often that we find remarks so unprejudiced and thoughtful as those which have appeared in the June number of the *Gazette des Beaux-Arts*, and we are led to quote at some length the remarks of M. Duret on the two exhibitions of the Royal Academy and the Grosvenor Gallery.

Of course, we in England understand the worth of M. Duret's statement that by the mutual situation of our two London exhibitions "the terror which weighs on certain French painters of being refused at the *Salon*, and thus strangled, is unknown to the English artist;" but we strongly suspect that French readers of the *Gazette des Beaux-Arts*, unacquainted with the details of our Academy system, will be somewhat misled by such a picture of artistic bliss. Of the representatives of "classic art," Sir Frederick Leighton and Mr. Poynter, our critic has not much to say; they occupy in our school, he remarks, relatively the position held in France by M. Cabanel and M. Bouguereau. In his estimate of the President of the Royal Academy, M. Duret is not enthusiastic; he considers, however, all praise is due to an artist whose endeavour is to impregnate the old traditional forms with a new spirit. Of Mr. Poynter's work our critic is evidently no admirer. To Mr. Millais and Mr. Watts, he next turns his attention, and his remarks, while in themselves open to criticism, merit at least examination. Our critic fully assents to the position Mr. Millais occupies on the score of the wonderful series of works he has produced, "but," he continues, "the infatuation of the public surpasses all bounds, when it seeks to place him absolutely without a rival, to make of him a great master."

This view of a French critic is explainable. It is difficult for the English critic to appreciate the reputation of painters who hold in France an equivalent position to that of Millais, such painters as Baudry or Carolus Duran; they, we suppose, however, are as thoroughly national in their spirit, as Millais is English; hence, we imagine, the mutual misunderstanding, though we suspect that the future, which will judge the question in a completely unbiassed manner, will decide without hesitation in favour of the English painter. Our French critic recalls in warm terms the work of Mr. Millais in his pre-Raffaellite days, and contrasts with its careful, forcible, expressive character, the work the painter now exhibits, "hastily produced with the least possible amount of previous reflection, approaching manufacture"; and, after some severe remarks on the interesting series of exhibits with which Mr. Millais has been lately delighting the public, says, "when we recall the old pictures, bold and vigorous, that Millais painted, and see what he produces now, we feel inclined to say, 'Paint us, as formerly, the pictures in which you sought to please yourself and not the public.'" We only regret that M. Duret, as a Frenchman, finds nothing more to say in praise of a painter who, like Millais, in spite of having been so long a favourite, continues to paint so nobly; far less success gained by an artist on the other side of the Channel would have long since spoilt and ruined his productive powers; it is, indeed, given alone to the favoured few, in art especially, to withstand the fatal effects of what is understood by success.

Mr. Watts is the next artist to whom our French critic turns his attention, and very complimentary are his studied remarks on that cultivated artist. Mr. Watts's technical difficulties of execution and uncertainty as to methods, in our critic's view, are, however, easily traceable in the painter's work: "While his broad and simple drawing has remained throughout constantly the same, his processes of painting have frequently varied. The want of success that has followed some of his works," remarks M. Duret, "is due to the fact that each time he is face to face with his model, he sincerely endeavours to place it as living as possible on his canvas; it is only those who have created themselves a conventional manner once for all, who accustom themselves to a process, and are contented with a mean, who never excel themselves and never feel deceived."

Mr. Whistler, to whom a few words are devoted, is, we might observe to M. Duret, scarcely an English artist. The remarks on Mr. Albert Moore, though somewhat severe, will, we suspect, be in accordance with the opinions of not a few readers. Admirers of the school of which Mr. Dante Rossetti was the founder, and of which Mr. Burne Jones was once the humble follower and now is the high priest, will read with interest the remarks of a foreign critic on this peculiar phase of English modern art; but on the sickliness of some of its productions,—and Professor Richmond's work comes in for a share of reprobation,—our French critic is quite as severe in his remarks as are some of his brethren on this side of the Channel.

Here M. Duret stops his criticism,—and we have mentioned all the names to which he has devoted any notice,—having exhausted, so he tells us, the "list of English painters whom everybody would place in the first rank as original artists." The list is short, and there are some rather characteristic names omitted; it is not a difficult thing, apparently, for a French critic to exhaust the Royal Academy and "the Grosvenor."

The water-colour artists, as M. Duret remarks, are represented at our two leading exhibitions, only in a very fragmentary manner. We feel sure that many of our readers will agree with our foreign critic in regretting the absence of any exhibition of the works of our book and paper illustrators, who, as M. Duret observes, have struck on "a vein full of savour and originality"; but it is to Mr. Keene, of *Punch*, that our critic devotes his warmest encomiums. While it is gratifying to read such praises as conclude M. Duret's article, it is matter for reflection that perhaps the first well-understood criticism on the work of Keene should reach us from beyond the Channel. We do not think, however much our exhibitions may rouse sadly differing views, that our critic's remarks on Mr. Keene will awaken the spirit of opposition,—"What drawings! full of force, of accent, of raciness, broadly treated and simple. This is high art (*voilà du grand art*), living art, which has its roots in the depths of human nature." Our witty contemporary,—who, by the way, is our contemporary in existence almost to a year,—requires by this time none of the aids of ordinary advertisement, but we think that when M. Duret closes his article with the following words, *Punch* may

look for a somewhat increased circulation on the other side of the Channel: "If you wish to see the Engli-h, living, moving, and breathing, à *l'anglaise*, touched off to the life by a thoroughgoing Englishman, who has borrowed nothing from ancient Greece and Italy, take *Punch* every week and look at the drawings signed with a C and a K interlaced."

It is not, as will be seen, a very comprehensive view of English art that has been presented to the readers of the *Gazette des Beaux-Arts*, but with the amusing indifference which prevails in France as to the existence of a great art movement in this country, we must be thankful to any French writer who is bold enough to dare to try and interest any of his countrymen in the successful doings of our artists.

INTERNATIONAL MEDICAL AND SANITARY EXHIBITION.

THE Exhibition formed in the Quadrant Galleries of the Royal Horticultural Gardens is now in shape, and will be opened formally on this Saturday morning, the 16th, by the President, the Right Hon. Earl Spencer. It includes 472 exhibitors, the majority of whom send matters in which our readers are greatly interested, and should be largely visited. Two classes of awards will be made, viz., "First Class," and "Award of Merit." The judges began their work on Thursday, but it is not likely that the awards will be made until after the opening. We shall hereafter give particulars of some of the principal exhibits. The following is the programme intended to be observed on the opening day:—

At half-past four o'clock the President, the Right Hon. Earl Spencer will take the chair.

Report of the Executive Committee of the Parkes Museum of Hygiene, to be read by the Honorary Secretary, Dr. G. V. Poore.

Statement of the Exhibition Committee, to be read by the Secretary, Mark H. Judge, Esq.

Addresses by the Right Hon. Earl Granville, K.G.; the Right Hon. John G. Dodson, M.P.; and Sir James Paget, Bart., D.C.L., LL.D., F.R.S.

PRESIDENT TO DECLARE EXHIBITION OPEN.

Vote of Thanks to the Right Hon. Earl Spencer, for presiding, to be proposed by George Godwin, Esq., F.R.S., F.R.I.B.A., seconded by John Erichsen, Esq., F.R.S.

The Hungarian Band will play in the arena, and the Picture Gallery, with Fine Arts Collection, will be open for promenade.

The Exhibition will be open till dusk, and at six o'clock the Hungarian Band will play in the Conservatory.

Some misunderstanding having arisen as to the delivery of the exhibits by working plumbers in competition for the prizes offered in connexion with Mr. Hellyer's lectures, we are requested to say that the work of any plumber will be received and placed in position if he sends his name and address with his proposed exhibit. Parcels should be addressed to Mr. Mark H. Judge, Exhibition-road, South Kensington. Such exhibits must be delivered by Tuesday next, so that they may be included in the appendix which will be published with the second edition of the catalogue. Season tickets will be issued to exhibitors when the exhibits are received.

CHARTLEY.

THE disproportion between the interest they excite and the intrinsic worth of their remains is characteristic of the ruins of our old castles. A broken-down tower, a few yards of shapeless wall, provided they are of undoubted antiquity, enhance the value of a whole district. The eye continually reverts to the solitary elevation on which they are mouldering away.

This is the case with all that remains of Chartley Castle after the lapse of more than 600 years. It stands upon one of a group of grassy hills between which wind slender streams that have their source in the neighbouring uncultivated moorland—the "mighty large parke" of old Leland,—and unite at length in a tolerable-sized lake in a contiguous hollow in front of the modern mansion of Earl Ferrers.

The high road runs at the foot of the hill, and sweeps of grassy meadows rise gently from it to the margin of the castle moat. The only prominent part of the ruins,—indeed, almost the only remaining part in any state of preservation,—are two lowish round towers standing near together, and connected by a short length of curtain-wall. They are a fragment of the defences of the castle on its southern face. These twin towers of grey masonry are conspicuous objects from the wide valley of the Trent, across which they look to the waste of Cannock Chase. Their bleached circles are made more prominent by the elms and ashes and black yews that shelter them, rooted everywhere on the slopes and along the margin and in the bed of the half-filled moat. Abundant ivy overruns what are now only heaps of stones, the shapeless "cores" of other walls and towers that have disappeared. There is an indestructible charm in the curves of the masonry of a round tower. The circle can afford to dispense with ornament when no other form can. The diameter of these towers is nearly 50 ft. They are two stories in height above the original level of the castle court or bailey, and formerly they may have been considerably higher; but the wild weeds and chance-sown flowers have long taken the place of their ancient cornices at a reduced level. Their external faces of ashlar masonry are well preserved; the courses of small well-fitted stones are nearly perfect. The projecting base-courses that rise direct from the slope of the moat are intact. Only some of the arrow-slits higher up have suffered. Those portions of the towers that faced inwards to the castle court, and were built square, are utter wrecks, though fragments of their walls remain, with window-jambs and sills still *in situ*, and there are steps down to a level below that of the court outside.

The steep mound to the west of the castle area, belted with waving yew-trees, marks the position of the ancient keep. The original masonry has disappeared, and brickwork of modern date has taken its place.

The successor of Hugh the Wolf of Chester, Ranulph de Blundeville, was the builder of Chartley. He began it in 1220, building as well about the same time upon the rock of Beeston. But Chartley quickly passed by marriage into the hands of the Earls of Ferrers, who held it in conjunction with the neighbouring castle of Tutbury. Neither in position nor extent can Chartley vie with either Beeston or Tutbury,—Beeston on its lofty solitary rock, visible to half Cheshire; Tutbury, on its green hill, planted in a loop of the double-branched Dove.

In 1266 Robert Ferrers, Earl of Derby, lost Tutbury, and was stripped of all his other possessions with the exception of Chartley, the result of his fruitless struggle against Henry III. It was about that time that he gave the advowson of the little church of Stow to the Priory of St. Thomas, on the river bank by Stafford, for the welfare of the souls of his wives, Mary and Eleanor. Stow Church, with its squat tower, is not visible from Chartley, an intervening hill shutting it out; but it is worth a visit for the sake of its Norman chancel arch and the arch of its south porch, and for the tomb of Sir Walter Devereux, "Earl Ferrers and of Chartley," whose effigy lies extended between those of his two wives upon a well-preserved altar-tomb in the chancel. If the sculptor has faithfully portrayed his subject, we may infer that Sir Walter was a good man, with a particularly well-arranged head of hair. All three figures carry their hands upon their breasts, the palms pressed closely together, the finger-tips pointing upwards. A hush seems to pass from the monument over the church. It suggests reverent hope, and not, as is so often the case, the despair of death.

This same Sir Walter Devereux, who died 1558, was the builder of the "goodly manor-place" that stood "a good flite-shot" from Chartley Castle, that Leland commemorates in his "Itinerary." Chartley had passed to the Devereux by marriage in 1450. Plot has preserved a view of this "principal house of the Ferrars," which shows the interior of a court with a fountain in the middle, and three sides of a timbered building, with a corner porch and gabled oriels. Hither came Queen Elizabeth in 1575, and here, in 1585, Mary, Queen of Scots, was kept a prisoner for nearly a year, brought hither from Tutbury, and hence she passed to Fotheringay to die. This "ancient edifice" was destroyed by fire in 1781. It is a remark of Hawthorne's that, owing to the excellence of the Italian climate, it is difficult to realise the age of the classical remains there, and that an English ruin looks far older than the monuments of the Roman Forum. So it is with these remains of Chartley; they seem fabulously old in the midst of a landscape from which all similar relics have disappeared. Symbols of an age wholly passed away, they are aliens on the hill, while the leaves that thicken about them in spring-time, and the grass that waves up to their very feet, belong to a scene entirely pastoral.

To see Chartley and not to see "the park" that lies about a mile away would be a great omission, for they are united in interest, and boast an equal antiquity. Were the remnants of Blundeville's towers to be plumped down on that primæval moorland, they would have a background as little changed as themselves. The park has never been subjected to cultivation. It looks to-day as it did 1,000 years ago. The trees may have dwindled away, but it has known no other change. Needwood Forest, that lies a little distance off, is scarcely more than a name. It has been absorbed, and all its mighty trees have been cut down. The park remains, and may be accepted as a patch of original England. The wild cattle of Chartley, a primitive breed, whose appearance is a sufficient voucher for their antiquity, apart from tradition, are its occupants.

D.

THE GREAT CENTRAL HOTEL, CARLISLE.

ON the 2nd inst., the Great Central Hotel, on the Victoria Viaduct, Carlisle, was opened to the public with some ceremony. A large number of guests visited the house, upon the invitation of the proprietor, Mr. Westmorland, of Liverpool, inspected the arrangements, and partook of luncheon. The new hotel, which takes its name of the "Great Central" from the circumstance that it is close to the Viaduct entrance to the enlarged Central Station, consists of four stories, in addition to basement and attics. Entering the main door from the Victoria Viaduct, the visitor finds a long corridor in front of him. On his right is a commercial room (45 ft. by 20 ft.), well lighted both by day and by night; and on the left a coffee-room (35 ft. by 20 ft.). In both rooms, as indeed in all the large rooms of the house, the Westmorland-Birkett patent ventilator has been adopted. Passing along the corridor, the grand staircase is reached, a view of which is commanded from the window of the "bar" on the opposite side of the corridor. A smoke-room is attached to the bar, and further along the corridor on the right hand side we come to a large room (33 ft. by 20 ft.), which is to be devoted to the use of farmers on Saturday. On the opposite side of the corridor are the manager's sitting-room, still-room, back stairs, lavatories, and at the end of the corridor two swing-doors admit the visitor to a billiard-room (45 ft. by 25 ft.) fitted with three tables. On the first floor are the ladies' coffee-room, situated immediately over the commercial room; four sitting-rooms with waiting-rooms and bedrooms; and, at the opposite end of the corridor, over the billiard-room, an assembly-room (45 ft. by 25 ft.). In all seventy-five beds can be made up in the hotel. In the basement there is a restaurant, 45 ft. by 20 ft., approached either from the Viaduct or through the hotel, smoke-room, travellers' stock-room, and kitchens. The architectural character may be described as "Queen Anne." Mr. Westmorland executed most of the work himself, but he let some portions which may be specified. Mr. Anderson, of Glasgow, executed the plumbing; Mr. Ormerod, of Carlisle, the cement corridors and floors; Mr. Ferguson, of Carlisle, the plaster work; Mr. Graham, of Carlisle, the iron work; Mr. Waddell, of Carlisle, the electric bells; Messrs. Forest & Son, Liverpool, supplied the ornamental glass; Messrs. Holgate & Fishwick, Liverpool, the bar-fittings. The walling stones, of white Lazonby, were supplied by Mr. W. Graves. The stone carving was done by Mr. Gedling, of Carlisle. Mr. Daniel Birkett, F.R.I.B.A., of Carlisle, was the architect.

Large Figures.—At the thirtieth annual meeting of the Birkbeck Building Society, held on July 7th, the report presented stated that the receipts for the year ending 31st March last were 7,147,763*l.* or an increase of 1,437,831*l.* over those of the previous year, and the total from the commencement of the Society 56,942,588*l.* The deposits reached the large sum of 5,789,998*l.* The gross profits earned by the Society amounted to 108,721*l.*, of which 89,759*l.* have been appropriated to the payment of interest on shares and deposits, discount, and expenses of management, leaving a net profit of 18,963*l.*, which, added to the previous balance, brings up the total of undivided profits to 132,211*l.* to be dealt with next year, when the triennial bonus has to be declared. The surplus funds are described as amounting at the present time to 2,196,750*l.*

OUR IRON AND STEEL INDUSTRIES.

BEFORE the tardily-published "Mineral Statistics," we have, in the report of the British Iron Trade Association, now issued for the past year, a mass of fact in regard to the Iron, Steel, and allied trades, and the importance of these trades, as well as the peculiar interest that just at the present time attaches to them, make a summary of some of the semi-official statements given in the report alluded to of more than common interest. The report gives what must be considered accurate details of the production and importation of iron ore, of the production of iron and steel, and a mass of other facts. One of the most notable of the features in one of the branches of the trade is the large importations of iron ore. It is shown that whilst twelve years ago the importations of iron ore from other countries were to the extent of 114,435 tons only, last year they were to the extent of 2,634,401 tons, a rate of increase far above that of the production of iron, so that it is evident that there has been an increased proportionate use of the foreign ores—chiefly of those of Spain. It is believed that the production of iron ore in the United Kingdom was to the extent of 17,300,000 tons last year; and hence it is apparent that of the total iron ores used in the country, about 13 per cent. used was imported. South Wales received the largest portion of this imported ore, but it is significant that over 658,000 tons were received for use in the Cleveland and Durham iron-making district—the district in which our largest supply of iron ores is found. Hence there is the strongest possible proof that the rich, if dearer, ores of Spain and Algeria are used in very great quantity, and this is one of the tokens of the spread of the steel industry and of the manner in which it is pushing out the use of iron for certain purposes.

Without giving the exact quantities of iron ore produced in the different districts to yield the above-stated total, it may be said that out of that total, Cleveland yielded 33 per cent., Lancashire and Cumberland 15 per cent., Scotland 17 per cent., North Staffordshire slightly less than 10 per cent., Lincolnshire under 5 per cent., Northamptonshire 8·5 per cent., South Staffordshire 3·4 per cent., and South Wales 2·5 per cent. It is worth while adding that a very small part of the iron raised is exported,—about 100,000 tons having been sent out of the country last year, nine-tenths of that quantity being sent to the United States. Coming to the production of pig-iron, we are told that whilst in 1879 there were produced 6,009,434 tons of pig-iron in Great Britain, last year there was the vast increase to the production of 7,721,833 tons. Every one of the large districts in the country contributed to that increase. Cleveland heads the list of the districts with a yield of over 2,510,000 tons, Scotland following with 1,049,000 tons; West Cumberland, 751,371 tons; North Lancashire, 745,934 tons; South Wales, 877,430 tons,—Staffordshire, 574,000 tons West Yorkshire, 285,000 tons; Derbyshire, 356,000 tons; and Northamptonshire, 167,000 tons, being the only large producing districts. It appears from a valuable return of the stocks of pig-iron in the hands of the makers that there were at the end of the year only 1,541,411 tons of pig-iron so held, or, in other words, the stocks so held were only equal to ten weeks' consumption at the rate of that of the past year. And vast as was the production of pig-iron last year, it was with a portion only of our smelting-plant, for though there were 573 furnaces in operation, there were no fewer than 394 others idle. It may be added that in the Cleveland and Durham district, the average production of each furnace has been raised from 16,000 tons yearly to over 22,400 tons yearly, whilst the average output of the Scottish and other furnaces has also greatly risen. The uses of this iron have been very varied, but the greatest variation from that of the previous year was in the great enlargement of the quantity converted into Bessemer steel.

As to the manufacture of pig-iron, we have a mass of statistics. Those of the Cleveland and Durham district are the most complete, and from these it appears that, in 1879, the associated makers in that district produced 293,000 tons; last year 508,000 tons were made,—the increase being the most marked in the plate and angle trade, and this has been at generally higher rates than that of the previous year. Roughly, it is stated that, whilst the selling price of the manufactured iron in this great district was, for the year 1879, about 1,587,000*l.*, last year it rose to 3,029,000*l.* In Wales there was also a growth in the trade,—a growth to the extent of 85,000 tons on the year. It is believed that this was a general experience of the districts that yield large quantities of manufactured iron. Coming to the steel trade, we are told that last year not less than 1,044,000 tons of Bessemer steel ingots were produced in the United Kingdom,—an increase of 209,000 tons on the output of the previous year. The largest addition to the production is in the Sheffield district, next in that of the north-east, and next in that of South Wales,—these three districts giving over 176,000 tons of the increase. From part of this, the greatest production of Bessemer steel that has yet been known in the kingdom, there were rolled 739,000 tons of steel rails, South Wales producing the largest quantity, and next Sheffield; the other large producing districts being those of Sheffield, Lancashire, Cumberland, and the north-east. And, large as was the production of Bessemer steel, it appears that it was from seventy-eight converters out of 106 erected in the United Kingdom, the remainder having been idle. For the first time in the history of the Bessemer steel trade, Great Britain took only second rank as a producer, the United States exceeding our output, but by a few score of tons only. The second great branch of the steel trade is that of the open-hearth steel manufacture. Of this class of steel it appears that, last year, there were produced in the United Kingdom 251,000 tons, or 76,000 tons more than in the previous year. Practically, this is produced by the districts named above as the makers of Bessemer iron, South Wales taking the lead, and being followed, in the order given, by Scotland, Sheffield, Lancashire, and Cheshire, the north-east coast, and some smaller districts. There are now, it appears, 126 open-hearth furnaces in the United Kingdom, and, in addition, seventeen others are in course of construction, so that not only is it apparent that Great Britain is at the head of the Siemens steel trade, but that it means to remain so. These are the chief of the fresh facts brought out by this valuable report, and it is worth notice that the general tone of the teaching of the facts presented is less unsatisfactory than had been believed. The great production of iron and steel in the past year was nearly all put into consumption; and with a comparatively favourable year last, it may be hoped that there will be in the present a continuation of the recovery in our trades.

PROJECTED ROUTES ACROSS THE ALPS,

AND A FORECAST OF THE RAILWAYS OF THE FUTURE.

AMONG the abstracts of papers from Foreign Transactions and periodicals prepared for the forthcoming volume of the Proceedings of the Institution of Civil Engineers (which will form vol. lxiv. of that valuable series) will be found notices of the several views advocated by M. Colladon, by M. Maimeri, and by M. Lommel, as to the Trans-Alpine communications between France and Italy, of the different projects for which we gave some account recently (vol. xl., p. 692). These are taken, the first from the *Revue Universelle des Mines*, the second from the Italian journal *Il Politecnico*, and the third from a paper presented by M. Lommel to the Swiss Scientific Society, at a recent meeting at Brique.

The main reason, according to the Italian journal, for constructing a fresh line of communication across the Alps, intermediate between Mont Cenis and Mont St. Gothard, is to prevent the injury which France would sustain by the threatened diversion of traffic to the latter route. A railway taking the Mont Blanc route would lie altogether within French and Italian territory, while the Simplon line would run for eighty-three miles through Switzerland.

The east of France, of which Dijon is the principal centre of railway traffic, is the district chiefly affected by the line of route to be determined. Signor Maimeri has taken Collonges, a station about fourteen miles west-south-west from Geneva, and six miles from Bellegarde, on the Rhone, as a starting-point on the French side, and Milan as the corresponding centre in Italy. Between these points, the length by the Simplon is stated as 244 miles, including eleven and a half miles of tunnel at the summit. The equivalent length to be added for the resistance of the gradients is stated at twenty-one miles, making a virtual total of 265 miles.

The Mont Blanc route is seven miles shorter, as measured on the ground, than the former. The summit tunnel is three-eighths of a mile longer; but the allowance of forty-one miles necessary for gradients, according to Signor Maimeri, gives a virtual length of 278 miles, or thirteen miles more than the Simplon route. A third line is proposed by M. Maimeri and M. Stamm, involving a Mont Blanc tunnel of nine and a quarter miles, and with a measured length of 214 miles; the allowance for gradients on this route is forty-eight miles, giving a virtual length of 262 miles.

For the Simplon Tunnel, the average gradients of approach would be one in 250, and one in 205. The projected tunnel would be from 1,140 ft. to 1,650 ft., or even 1,950 ft., less elevated above the sea than the St. Gothard, the Brenner, the Mont Cenis, the Arlberg, or the Mont Blanc summits (as the latter is regarded as practicable by M. Colladon). The average gradients of approach to the latter tunnel, according to this writer, are one in 85, and one in 130.

Length of line, height of summit, and severity of gradient are, however, points as to which the comparison assumes the practicability of executing the line. This, however, is not all plain sailing. As far back as the year 1879, Dr. Stapff, the engineering geologist of the St. Gothard Tunnel, communicated to the *Revue Universelle des Mines* some very interesting observations as to the increase of temperature underground, as determined, not by height above sea-level, but by depth below the superincumbent surface. From a wide experience, in Mexico and the United States, as well as in the St. Gothard Tunnel, Dr. Stapff came to the conclusion that a heat of 104° Fahrenheit, being about 6° Fahrenheit above the ordinary heat of the human body, is the highest temperature at which work can be continuously effected by manual labour. The highest temperature observed in the Mont Cenis Tunnel was 86° Fahr. That in the St. Gothard Tunnel is stated by Dr. Stapff at 87° Fahr. on the south side, in air surcharged with moisture, and 84° Fahr. on the north, in air not quite so moist. But higher temperatures were said to have been attained at the time of the completion of this tunnel since the publication of the above paper, of which we have no exact record.

The rate of increase of temperature with depth depends on the cross section, as well as upon the longitudinal section, of the surface above the point of measurement. Thus, comparing equal depths below a mountain peak, or below the bottom of a valley, the heat would increase proportionately much faster in the latter case. As a mean, Dr. Stapff proposes the allowance of 1° Fahr. for every 88·1 ft. in depth below the surface, the increase being less below a peak, and more below a hollow.

For the higher and shorter tunnel, proposed by M. Stockalper through the Simplon, at a height of about 2,560 feet above sea level, M. Stapff estimates the depth below the ridge at about 5,900 feet, and the rock temperature midway in the tunnel at 104° Fahr. But in the longer and lower tunnels projected by Messrs. Favre & Co., and by M. Lommel, the depth below the ridge would be 7,300 ft., and the temperature midway 116° Fahr. for the rock, and 127° Fahr. for water issuing from the rock. The utmost cooling effect produced in the St. Gothard tunnel, when four rock drills were at work, discharging exhaust-air at from 2½ to 4 atmospheres pressure, did not exceed 7° Fahr., and during the clearing away of the material excavated the heat of the air continued to rise to as much as 7° Fahr. above the rock temperature. It is evident that this carefully collected experience can only be neglected at the peril of any projectors. M. Lommel argues from some statements as to the temperatures in the Comstock mines, Nevada, that the air temperature can be kept as much as 14° Fahr. below the rock temperature. He has, however, made no allowance for its occasionally rising higher.

The estimate of Signor Tatti, a colleague of M. Colladon, for the Simplon tunnel of 11¼ miles long, is about 3,600,000*l.*, or about 313,000*l.* per mile. To this has to be added 150,000*l.* for connecting the northern end with the present railway terminus at Brique, and 640,000*l.* for 12¼ miles of line from its southern end down to the railway terminus at Domodossola, making a total of 4,390,000*l.* for the entire work. For the Mont Blanc tunnel of 11¼ miles, he allows the same sum of 3,600,000*l.*, to which he adds 1,136,000*l.* for 22¼ miles of line at the southern end, and 2,054,000*l.* for 40¼ miles at the northern.

end, making in all 6,790,000l. Signor Maimeri considers that the work could be done cheaper. He estimates the Mont Blanc tunnel of 9½ miles at 2,646,000l., being at the rate of 16l. per yard, that estimated for the St. Gothard tunnel. From the southern end to Aosta he reckons barely 22 miles of line at 32,000l. per mile, and from the northern end to Cluses he takes as 26½ miles more at the same rate. The 13½ miles from Cluses to La Roche he puts at 25,600l. per mile, making a total for the route of 4,555,200l.

It must be evident to any careful observer that a halt ought to be called in any projects as to new lines through mountain passes, in presence of the recent discoveries in the transmission of electricity, and in its application to railway traction. At least, 2,000 h.p. of water power is said to be available at each end of the proposed Simplon tunnel; and in the other lines, no doubt, water power is almost equally attainable. The reduction of a summit is a piece of work for which, mechanically regarded, it may be worth while to pay very heavily. But, on the other hand, the proportion of the weight of the engine to that of the trains increases so rapidly with the angle of the gradient that it would take less power to take carriages alone up a gradient, say of one in forty, than to run the same carriages as a locomotive train over a gradient of 1 in 100. Nor is there any corresponding drawback as to speed. If the enormous dead-weight of the locomotive can be, as appears highly probable, dispensed with, the entire problem of railway transit over mountainous country will have to be reconsidered. The commercial utility of expending large sums to secure good gradients will become a matter to be investigated anew. The main features of the case will be altogether altered. We do not say that this is yet the case. But we say that it has been shown certainly to be conceivable, perhaps to be possible. And if we add the hope of the solution of the two problems, that of the utilisation of water-power, and that of the traction of trains without locomotives, together, and suppose each of these problems to be ultimately soluble as dynamical questions, the days of long tunnels, deep cuttings, and lofty embankments for any new lines will be over, and the smokeless railways of the future will undulate over hill and dale with all the freshness and variety of the old coaching traffic, which had attained a state of such perfection on the Devon and on the Worcestershire roads just as the steam-horse was introduced to run the four spanking high-breds off the road.

ARUNDEL MONUMENTS, CHICHESTER CATHEDRAL.

THESE monuments stand at the east end of the nave, north aisle. The lithographs represent the effigies of these tombs, the one with the male and female figures representing Richard Fitzalan, 14th Earl of Arundel, and his countess, the former beheaded in 1397. The single female figure is believed to represent Maud, Countess of Arundel, who died in 1270; the figures are recumbent. The earl's tomb was restored in 1843 by the late Mr. E. Richardson, of London, the restorer of the effigies of the Knights Templars in the Temple Church, but that of the Countess Maud is much mutilated, and has not undergone any restoring process. My drawing, however, shows the figure as it would appear if restored. This effigy has been much admired for the beauty of the drapery. A cast in plaster was made of the tomb some years ago for the Archæological Society, and subsequently another for, I believe, the Crystal Palace.

W. HAYDEN.

Royal Archæological Institute. — The Royal Archæological Institute, of which Lord Talbot de Malahide is president, has arranged to hold its annual congress at Bedford this year, during the week which extends from Tuesday, July 26th, to Monday, August 1st. Among the places set out on the programme to be visited are Elstow Church, the home of John Bunyan, Houghton Conquest, Bromham, Wobarn Abbey, Wrest Park, Luton, Dunstable Priory, the Roman camp and amphitheatre near Howbury and Sandy, St. Alban's Abbey, and the ruins of Old Verulam, Sharnbrook, Felmersham, Tottenhoe Castle, Willington, Cople, the earthworks at Bernard's Heath, and Risinghoe Castle. Mr. Charles Magniac, M.P., of Colworth Park, will act as president of the meeting.

ARCHITECTURAL AND ARCHÆOLOGICAL MUSEUM, BARCELONA.

BARCELONA is passing through the same vicissitudes which old and venerable cities mostly undergo at the hands of modern civilisation. Notwithstanding the great importance which the city enjoyed in the times of its earl-kings and during the Roman period, and the high position it has held in the history of the Spanish nation, and notwithstanding the fact, moreover, of its precincts having been adorned at one time with remarkable and beautiful palaces, convents, and other edifices of various styles of architecture of all ages, there scarcely remain now any of that number. Some are in ruins, others have disappeared entirely in consequence of political changes, while streets and squares have been opened on sites where formerly stood splendid monuments.

From this destruction, however, may be excepted the building called the Church of Santa Agueda, a lofty and well-shaped edifice, standing in the Plaza del Rey, adjoining the palace of the kings of Aragon, which is at present partly the convent of Santa Clara, and for which this church formerly served as the chapel. The walls of the edifice have recently been restored, its deterioration being caused partly by the events of 1835, partly by the use to which the building had been applied on several occasions. Such a use, unadapted to its preservation, was accelerating its total ruin, which, had it not been guarded against, in course of time would have resulted in irreparable loss. The preservation of this church is due to the praiseworthy exertions and zeal of the Provincial Committee of Monuments, which devoted its energy to attain this purpose, by collecting funds necessary to meet the heavy expenses involved, sparing neither pains nor means to make it appear at the present day precisely the same as it was in former times. The wishes of the Provincial Committee have been crowned with much success, and Barcelona is now proud to possess an historico-artistical monument, which will remind future generations of the authority and good taste of the sovereigns who maintained the dignity of the ancient crown of Aragon.

The Chapel of Santa Agueda is a work of the thirteenth century. It consists of a high and well-shaped nave of the Gothic style of that period, its roof being adorned with an ornamented ceiling. Admission to the choir is to be had by two staircases made through the walls of the edifice, one for women and the other for men. In the façade there are small windows, which are partly filled by painted glass containing representations of persons celebrated in the history of Catalonia. The belfry is one of the most noteworthy that exist in Barcelona.

Within this building the Museum of Architecture and Antiquities, founded by royal order, is temporarily installed. Its principal portion consists of the objects which formed the collection made by the Provincial Committee of Monuments, as well as those possessed by the Royal Academy of Belles-Lettres, thus making it a museum which, although not at present very comprehensive, is yet worthy of being visited by the lovers of art and archæological studies. It is to be hoped, however, that it will soon increase.

The specimens in the museum amount to 1,296 in number; they are not, however, arranged in separate sections, for want of sufficient room, a circumstance, too, which serves to prevent new acquisitions. On the side-walls of the chapel is shown an important series of keystones, fragments of pillars, and slabs containing inscriptions of the Middle Ages, and another of beautifully engraved medallions of the age of the Renaissance, shields of corporations, as well as those of the Catalonian nobility, and of the city of Barcelona, saved from the old buildings and convents lately pulled down. In the place formerly used as the presbyterium stand now, symmetrically arranged, some tombs of the Catalonian nobility and bishops. On the floor may be seen the valuable mosaic work found at Palau, in April 1861. It represents a Roman circus, 25 ft. long and 10 ft. wide, of which a description has been published in the *Musea Universal*.

Near the mosaic work, between two Roman pillars and various altars, is a statue in Greek drapery, beautifully arrayed. In the choir of the chapel is placed the collection of articles purchased from Don Eusebio Fortun, the Spanish consul at Arles, and which consists of a choice selection of pottery, arms, and articles of domestic use of the Romans, and various other objects of earthenware of Spain.

On the principal altar and its sides is to be seen an arrangement of variously ornamented frames of the fifteenth century, some of which possess merit, and are of historical importance, on account of having been paid for by Prince Dom Pedro of Portugal, pretender to the crown of Aragon.

On the outward side of this chapel stands a large collection of inscribed slabs, pillars, and Roman epitaphs, the former being very valuable, as an evidence of the political, religious, and social constitutions of the Romans. Besides these, there are also some fantastic gorgets,—large shields which had belonged to the demolished ramparts of Barcelona, and many slabs containing inscriptions in Hebrew, obtained from the mountains of Monjuich. There is also within the rails, within which these objects are enclosed, a tall pillar worthy of mention, belonging to the temple of Hercules, in Barcelona, and an emblem of nature worship, of colossal dimensions, held to be a rare specimen. Such is a succinct description of the illustration which we give in our present number.

FOXBURY, KENT.

THE mansion illustrated by the accompanying perspective view of the entrance front, and plan of the ground floor, is erected upon an estate of sixty acres, on rising ground to the right of the Kemnal-road, Chislehurst.

The external walls are built hollow, with Hassock stone rubble-work, faced on the outside with Kentish rag-stone laid in random courses, with a rock face, and lined on the inside with brickwork in cement. The masonry of the cornices, windows, doorways, &c., is of Combe-Down Bath stone, and the roofs are covered with Broseley tiles. The corridors throughout are of fire-proof construction, upon Fox & Barrett's principle. The principal rooms have been decorated with enriched panelled ceilings and characteristic high mantelpieces of oak, cedar, and walnut, inlaid with other woods, and the walls of the dining-room are lined with wood framing of pitch-pine.

The illustrations sufficiently show the general character of the architecture (which is that of the early part of the seventeenth century), and the arrangement and sizes of the rooms.

The principal entrance is on the east side, through an enclosed porch, paved with marble mosaic executed by Messrs. Burke & Co., leading into the entrance-hall, which is separated from the corridors and principal staircase by arcades of Portland stone.

The principal staircase, which is 19 ft. 6 in. square and 27 ft. high, has a wainscot oak staircase of three flights, protected by balustrades of pierced strapwork, with large newels at the landings, surmounted by heraldic animals after the fashion of those at Hatfield House and other houses of similar date. The staircase windows are filled with grisaille glass, having armorial medallions in the centre of the lights, carried out by Messrs. Heaton, Butler, & Bayne.

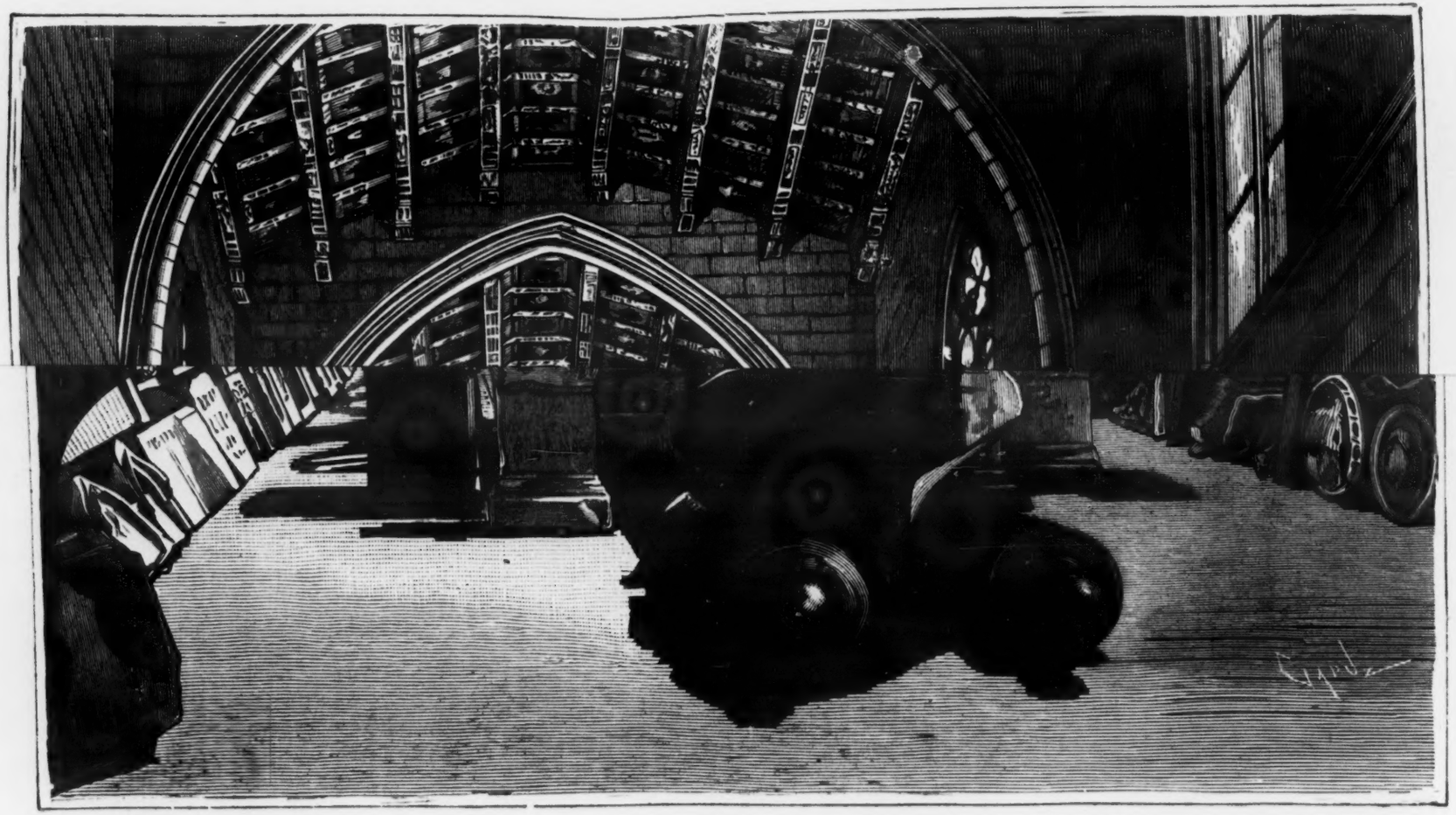
On the first floor, which is 11 ft. high, there are eleven bedrooms and dressing-rooms, and three bath-rooms, the servants bedrooms being arranged over the offices.

The basement-story is appropriated for the heating apparatus, wine, beer, and coal cellars, icehouse, &c.

The approach-roads and gardens were laid out by Mr. Milner, and lodges are placed at the junction of the carriage-drives with the Kemnal-road. The stables and kitchen-garden, with gardener's cottage and extensive greenhouses, are arranged on ground to the north-east of the mansion.

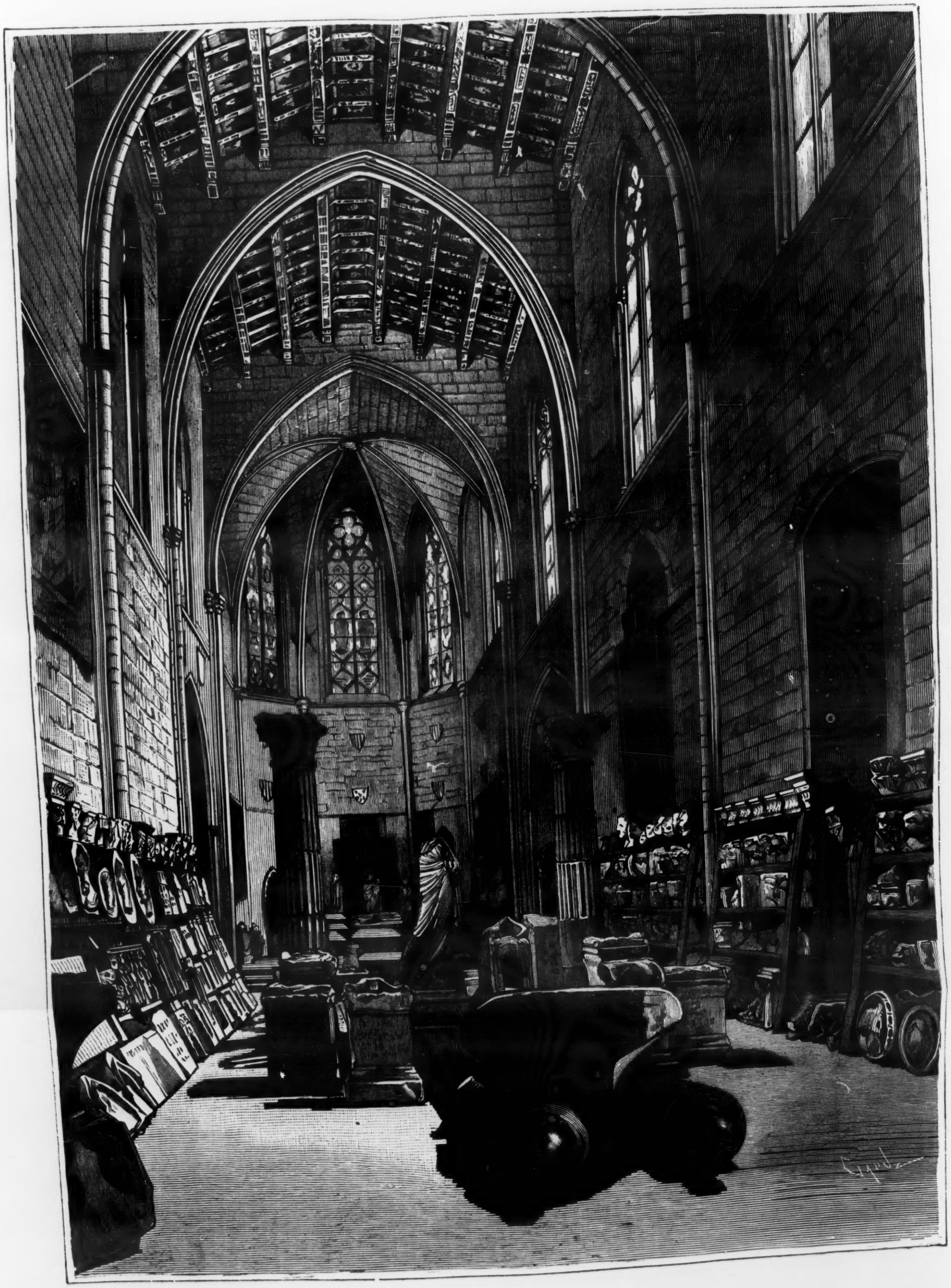
The whole of the works were carried out from the designs of Mr. David Brandon, by Messrs. Hill, Higgs, & Hill.

Fall of a Church Roof.—The roof of a church at San Mateo, Mexico, fell in during service on the morning of the 5th inst., killing over thirty of the worshippers present, the greater number being women. The church was being partially rebuilt, and while a party of men were working on the roof, one fell through, and the sudden rush of all the others at the same moment in their endeavours to get off, caused the remainder of the roof to collapse. It is reported that twenty of the workmen were killed, and that several were fatally injured.



THE ARCHITECTURAL AND ARCHÆOLOGICAL MUSEUM, BARCELONA, SPAIN.

THE CHURCH OF SANTA AGUEDA: THIRTEENTH CENTURY.



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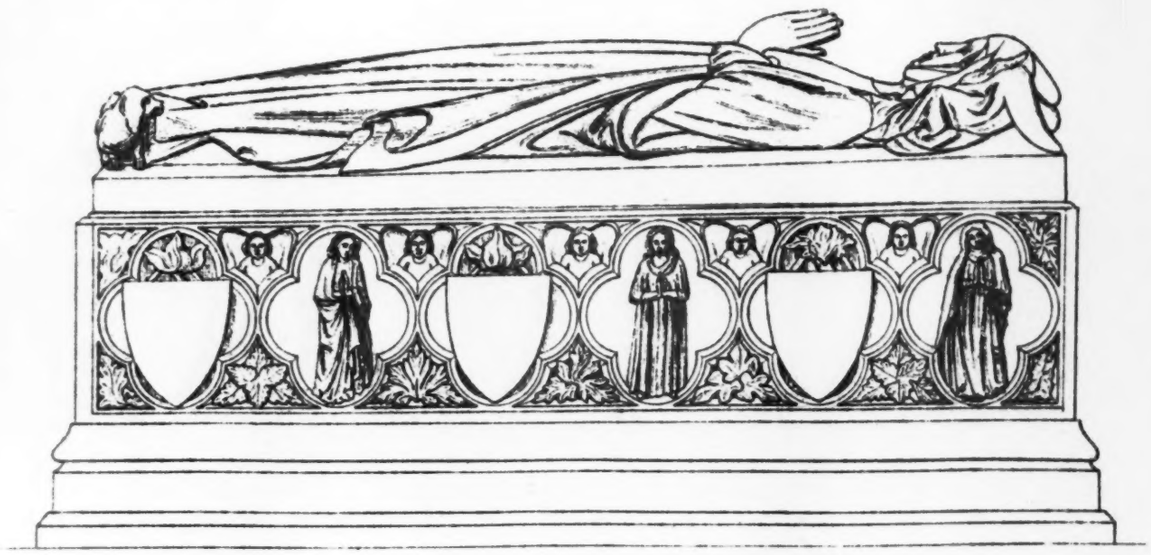
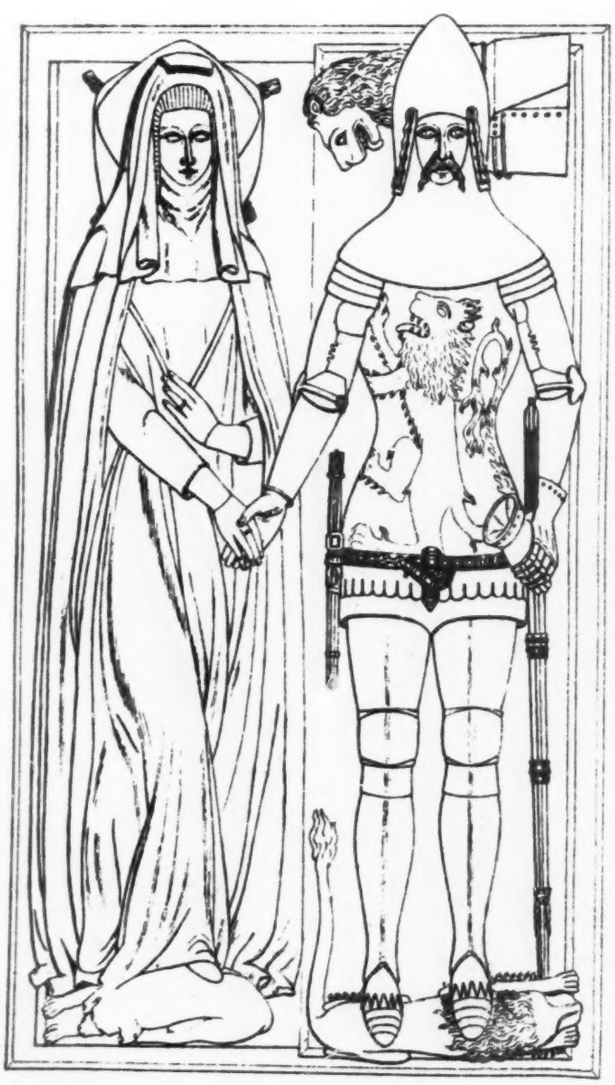


MONUMENT OF A LADY, SUPPOSED TO BE MAUD COUNTESS OF ARUNDEL.



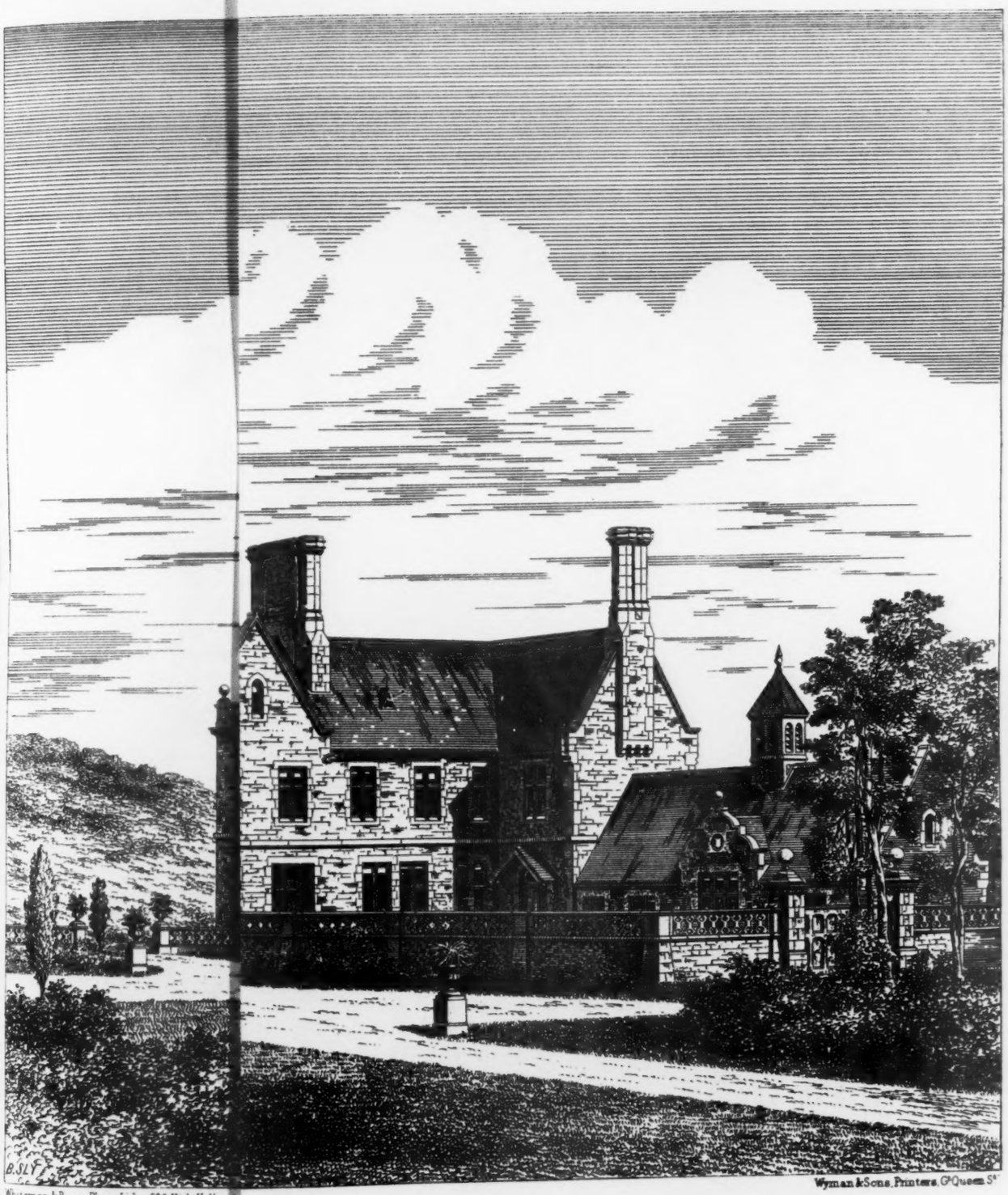
RICHARD FITZALAN, FOURTEENTH EARL OF ARUNDEL, AND HIS COUNTESS.

LADY, SUPPOSED TO BE MAUD COUNTESS OF ARUNDEL.

Whiteman & Sons, *Photo-Litho*

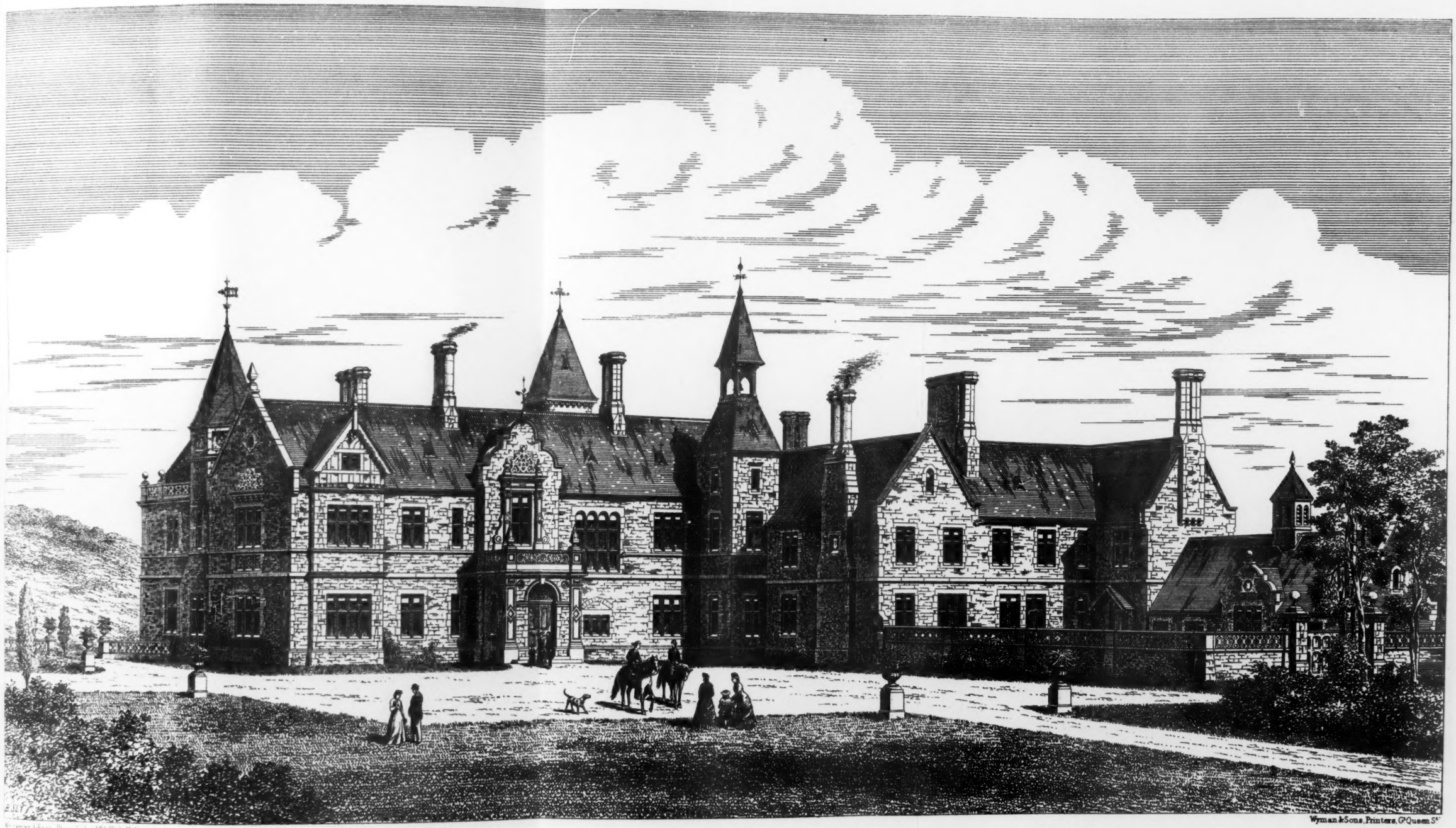
Wyman & Sons, Printers.

ARUNDEL MONUMENTS, CHICHESTER CATHEDRAL.



Wyman & Sons, Printers, Great Queen St.

Whiteman & Bass, Photo-Litho 236, High Holborn.



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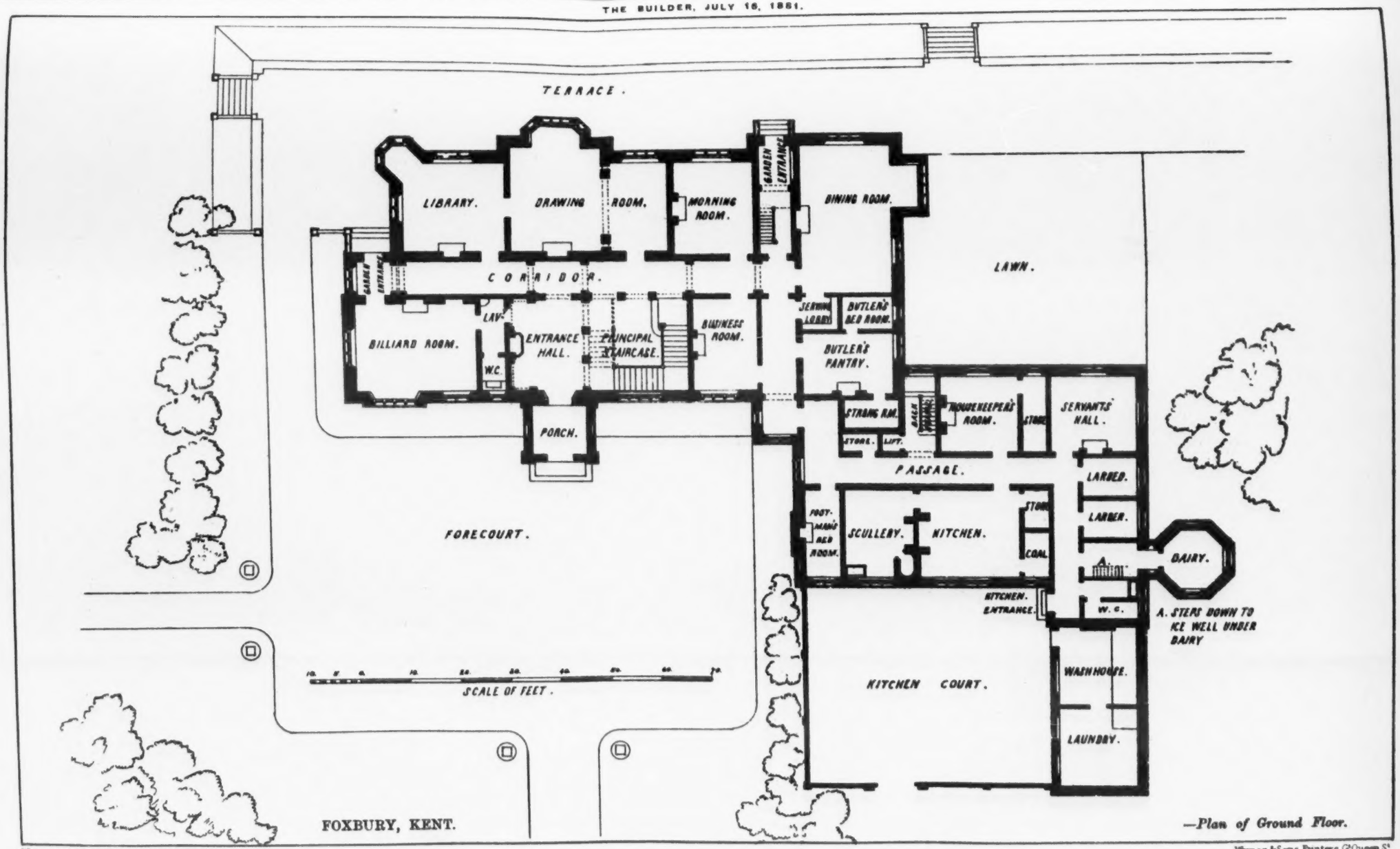
FOXBURY, NEAR CHISLEHURST, KENT.—Mr. David Brandon, F.S.A., Architect.

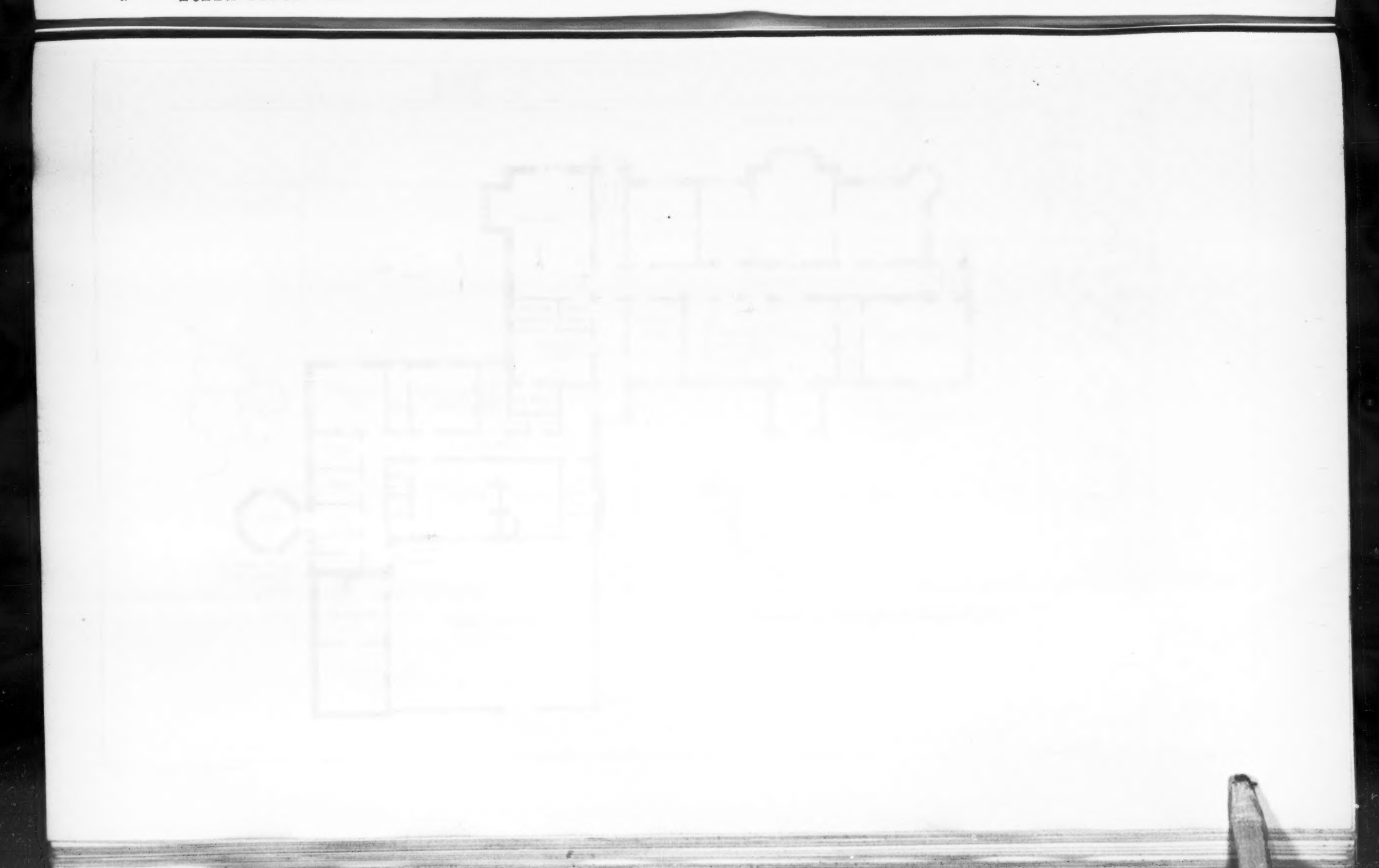


FOXBURY, KENT.

—*Plan of Ground Floor.*

Whiteman & Bass, *Photo-Litho* 236, High Holborn.

Wyman & Sons, Printers, Gt Queen St.



SANITARY PLUMBING.

HOUSE DRAINAGE.

THE fifth* of Mr. Hellyer's course of six lectures to working plumbers, under the auspices of the National Health Society, was given by him on Tuesday evening last, in the Hall of the Society of Arts. Mr. Rogers Field, C.E., presided.

Mr. Hellyer said the last subject dealt with ("Traps and Trap Ventilation") extended itself so much that if he kept strictly to the syllabus for the present lecture he should have to drop out the first half of the subject which should be dealt with on the present occasion, viz., "House Drainage and Ventilation." He therefore proposed to deal with the question of house drainage in the present lecture, and to postpone the subject of ventilation to the last evening of the course, substituting a lecture on that subject for the one announced on "The Art of Lead-Laying," which lecture he proposed to drop entirely out of the course. In commencing the internal plumbing† of a house, plumbers generally began with soil-pipes, but before they could get such pipes ready for fixing they required to know the kind of water-closets to be fixed upon them, so as to arrange the branches and traps accordingly. Privies served their purpose well enough when every man had a garden or piece of ground; but when men congregated together in cities and towns, remote places for putting such conveniences could not be found, and drains and sewers had to be made into which the general slops of the house were thrown. Instead of building water-closets as we do now, the rich ancients used close-stools or pans, which were frequently made of gold, besides the water-closets which were made in vaulted recesses in their kitchens. The Romans placed vases called *gastra* upon the edges of roads and streets for the relief of passengers, just as we now fixed urinals. Water-closets were of very ancient date. In Sir William Hamilton's account of "Discoveries at Pompeii," he says, in a paper‡ read before the Society of Antiquaries in 1775, "Close to the Temple of Isis is a theatre, no more of which has been cleared than the scene and the corridor that leads to the seats. In this corridor was a retiring-place for necessary occasions, where the pipe to convey the water, and the basin, like that of our water-closets, still remain, the wood of the seat only having mouldered away by time." Fosbroke, in his "Encyclopædia of Antiquities," (p. 397), says, "The water-closet in the Palace of the Cæsars is adorned with marble arabesques and mosaics; at the back of one is a cistern, the water of which is distributed by cocks to different seats." Olympiodorus says that in the Thermæ of Antoninus there were 1,600 seats of marble pierced like *chaises-percées* for the convenience of those who bathed.§ The fall of the Roman Empire led to the disuse of water-closets, and to a return to the customs of earlier ages. Beckmann says that in Paris, so late as the fourteenth century, the people had the liberty of throwing anything from their windows whenever they chose, provided they gave notice three times before by crying out "*Gare l'eau!*" This practice was, we learn, forbidden in 1395.‖ A like practice, however, seems to have continued much longer at Edinburgh, for in A.D. 1750, when people went out into the streets at night, it was necessary, in order to avoid disagreeable accidents from the windows, that they should take with them a guide, who, as he went along, called out with a loud voice, "Haud your han!" At that period, when the luxury of water-closets was unknown, it was the custom for men to perambulate the streets of Edinburgh, carrying conveniences (pails) suspended from a yoke on their shoulders, and enveloped by cloaks sufficiently large to cover both their apparatus and customers, crying, "Wha wants me for a bawbee?"¶ In a Parisian code of laws, which was improved in 1513, it was expressly ordered that every house should have a privy; but in the year 1700 they had not that convenience in every house, for at that time the police had instructions to see that each house had a privy, or to lock the house up if the occupants did not make one within a month. Sir John Harrington is credited by Nares with the invention of the English water-closet or latrine, in Queen Elizabeth's time, but Fosbroke says that was a mistake, though probably Sir John made them known in England. Aubrey, writing in 1718, describes a water-closet he had seen. He says,—"Here [at Sir Francis Carew's, Beddington, Surrey] I saw a pretty machine to cleanse an 'house of office,' viz., by a small stream of water no bigger than one's finger, which ran into an engine made like a bit of a fire-shovel, which hung upon its centre of gravity, so that when it was full a considerable quantity of water fell down with some force, and washed away the filth."* The first patent in this country under the laws of Patents for Inventions, was granted by James I. in 1617; but, according to the Records of the Patent Office, not a single patent was taken out for a water-closet until the year 1775, or 158 years after special licences were first granted for protecting inventions. In the year named, Alexander Cumming, a watchmaker, in Bond-street, took out the first patent for a water-closet, than which many water-closets in use at the present day were more unsanitary. The trap under Cumming's closet is shown by the drawing attached to the specification of the patent to have been a "round-pipe" or syphon-trap. Two years later (*i. e.* in 1777) Lemuel Prosser, a plumber living in the parish of St. Martin-in-the-Fields, took out a patent for what he describes in his specification as "a water-closet upon an entirely new construction, which will always remain free from any offensive smell." In spite of its inventor's claim, however, Mr. Hellyer thought that Prosser's closet was about as bad as the pan-closet, in being a closet which would never be entirely free from an offensive smell. In 1778 Joseph Bramah, of Cross-court, Carnaby-market, Middlesex, cabinet-maker, took out a patent for his invention of the now well-known valve-closet, which has since its inventor's time been improved in many points. But the difficulty of getting the "slider" of Cumming's closet, and the cranked metal valve of Bramah's, to always seat themselves so as to keep their basins fully charged with water, and to stand rough usage, led to the introduction of the pan-closet. William Law, a founder in Soho, made certain improvements in pan-closets in 1796. But such closets were not much used, though other improvements were made in them, before the early part of the present century. In 1826 William Downe, senior, of Exeter, also a founder, made further improvements in the pan-closet, reducing the size of the "container." One reason why the pan-closet had had a larger sale, and been more extensively used than any other closet, was that there were no valves about it, apart from its supply, to get out of order. It would also stand rough usage when well-made better than any other closet of its kind, but, on the other hand, it was the most unsanitary water-closet that the lecturer knew of, and ought never to be used. He was free to condemn it, for though nearly every water-closet maker made it, it belonged to nobody in particular. He was bound to admit that his own firm made them, for people would have them; but he never allowed one to be made if they could help it. His firm had porcelain enamelled the interior of the container part years ago, and they had made that part in white ware; but, no matter of what material, the pan-closet could never be made a wholesome one. Great care should be taken in selecting self-cleansing water-closets. No closet should be fixed which would not allow a flush of water of two, three, or four gallons to cleanse every part of it which could become fouled by usage. The less surface there was in a closet or trap, the better it could be cleansed, and unless such fittings were thoroughly cleansed after each usage they were sure to become unwholesome. He did not intend to point to any man's make in closets, nor would he bring his own before the meeting, for when self-interest came between a man's eye and any object, it interfered with its true proportion. All that he asked for was, that no waterclosset should be fixed which would not allow itself to be thoroughly cleansed, and its trap to be washed out, every time it was used. Passing to the subject of soil-pipes, the lecturer thought that lead was the best material for them, especially for this climate. The only material that at all came into competition with lead for soil-pipes was cast-iron, but he gave lead the preference, because it was more durable, more compact, and more wholesome. He did not pronounce for lead because of any fear that if cast-iron soil-pipes got into general use, it would injure the plumbing trade, for if the plumber could fix lead soil-pipe, which required the greater skill, on account of its "purpose-made" bends and wiped soldered joints, he could certainly fix cast-iron soil-pipe, which required the lesser skill, for the bends and socket branches in the latter case would be cast for him, and ready to hand; while as to the jointings, he would have no difficulty whatever in making them, whether (as in the case of light iron pipe) they were made with spun-yarn and red-lead, or in "cement," or whether the joints were caulked with lead, as they should be when the strength of the iron pipe would admit of it. No cast-iron soil or waste-pipe that would not admit of the joints being made of lead and well caulked should be fixed inside a house. Where plumbers were not skilled in pipe-bending and joint-wiping, it might be preferable to use cast-iron soil-pipe. Cast-iron certainly had the advantage over lead that a carpenter could not drive a nail, bradawl, or gimlet, into it, and when a soil-pipe was fixed inside a house it was worth something to the occupant to know that. Then, again, when the waste-pipes from baths and sinks were taken into a soil-pipe, as in the United States, it was better to use cast-iron, for the action of hot water upon thin lead soil-pipes was very injurious, unless slip-joints were used to allow for expansion and contraction; but, of course, it would not do to fix soil-pipes or waste-pipes with slip-joints inside a house. As to the size of soil-pipes, fifteen or twenty years ago it was common for plumbers to fix (under the direction of a specification) a 6-in. soil-pipe when it had to take the branches of four or five water-closets; and, with many of the architects and builders, as well as the plumbers, of to-day, 5 in. and 4½ in. were the general sizes, even where there was only one water-closet. Now, as it was of the utmost importance that a soil-pipe should be efficiently flushed out with water every time a water-closet upon it was used, it was evident that the smaller the size of the pipe the more efficiently would it be flushed, and as it was not wanted for a coal-shoot or a dust-shaft, the lecturer could not see why it should be so much larger than the outlet-way of the water-closet into it. In private houses, where the water-closets would be used with greater care than in public buildings, he considered a 3½-in. lead soil-pipe quite large enough to take a tier of three water-closets. (He was supposing the soil-pipe to be ventilated at top and bottom, and each trap ventilated as well.) He considered that a 4-in. soil-pipe, when of lead, and made by hydraulic pressure, was large enough to take the branches from several more water-closets, and that a 4½-in. soil-pipe was ample to take a tier of six double closets. He had had 3½-in. lead soil-pipes fixed to take tiers of three water-closets, and he had never known the smallest inconvenience to arise from that arrangement, while the pipes were found to keep cleaner than 4-in. soil-pipes near them. As to the position of soil-pipes, whether they should be outside or inside a building, he gave his voice in favour of outside. There was no danger of the stoppage of a soil-pipe by frost if there were no leaky closet-valves to let the water trickle into the pipe. The effect of frosty weather upon outside soil-pipes was not so damaging as the action of the sun upon them when they were fixed in certain positions, for they were often exposed to the direct rays of the sun for many hours together, the effect being to stretch the pipe between the "tacks," and such stretching would go on from year to year, bending the pipe out of its true vertical line, and perhaps breaking it. Where slip-joints could be used, such lead-pipes (when properly ventilated to prevent the action of gases upon them) would last for centuries; but where the joints must be soldered, the pipes should be placed in an angle or recess where they would be screened from the rays of the summer sun. In conclusion, Mr. Hellyer treated at great length on the ventilation and fixing of soil and waste-pipes, and of their proper disconnexion from drains. He urged that to get good water flushes through waste-pipes from sinks and lavatories, the inlets into such wastes should be as large as, if not rather larger than, the bore of the pipes, so as to get an efficient flush. Where the inlet into a waste-pipe was of smaller bore than the pipe itself, the latter could not possibly be efficiently flushed.

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* For reports of the previous lectures see the *Builder*, vol. xl., pp. 651, 711, 775; and current vol., p. 27.

† In a book called "The London Art of Building," published in 1734, plumbers' work is called "plumbery."

‡ "Archæologia," vol. iv., p. 168.

§ Fosbroke's "Encyclopædia of Antiquities," p. 67.

‖ Beckmann's "Inventions," vol. i., pp. 277-281 (1846).

¶ "Letters from Scotland" (1760).

* Aubrey's "Surrey," vol. ii., p. 160.

The Chairman spoke of the value of Mr. Hellyer's lectures as enunciating correct principles. He agreed with almost everything Mr. Hellyer had said, particularly as to the small risk of danger to outside soil-pipes from frost. During the severe winter of 1878-79, in only one case out of a large number of instances in which open soil-pipes had been fixed under his superintendence, did freezing take place, and that was found to be owing to a leaky closet valve. He published the results of his inquiries in the *Builder* at the time.* In conclusion, the chairman announced that, in deference to the desire which had been expressed, that an evening should be set apart for discussion at the conclusion of the course of lectures, the National Health Society would endeavour to make arrangements to that end.

An amusing though somewhat heated discussion arose, led by Mr. Pullen, who seems to have constituted himself the champion of the D-trap. He contended that it was a much better trap than the round-pipe or syphon trap, and, notwithstanding what Mr. Hellyer had said in a previous lecture to the contrary, that it was a self-cleansing trap. Mr. Davies also stood up for the D-trap, remarking that Bramah, so far from discarding it, used it under his valve closet. Mr. Pullen thought fit to question the competency, if not the impartiality, of the judges of the specimens of plumbing sent by working plumbers who have attended Mr. Hellyer's lectures (in competition for the prizes offered) to the International Medical and Sanitary Exhibition at Kensington. Mr. Gosling twitted the lecturer with inconsistency in making and supplying pan-closets when he condemned them, but Mr. Hellyer very fairly retorted by asking what was a man to do when, having taken the contract for the plumbing work and sanitary fittings in a large building, he was told, after a great part of the work was done, that pan-closets must be substituted for those originally intended to be used? He could only comply with the order, though protesting against the want of sanitary knowledge on the part of those who preferred such unwholesome appliances. The meeting broke up in confusion, not to say disorder.

The next and concluding lecture of the course will be delivered on Thursday, the 28th inst.

SANITARY MATTERS IN BIRMINGHAM.

ASSOCIATION OF MUNICIPAL AND SANITARY ENGINEERS AND SURVEYORS.

THE annual meeting of this Society was held in Birmingham last week, commencing on Thursday, the 7th inst., in the Council House. At the business meeting the retiring president, Mr. A. W. Morant, of Leeds, temporarily occupied the chair. Among the members present were:—Messrs. W. S. Till, Birmingham; Lewis Angell, West Ham; J. G. Lynde, Manchester; E. Pritchard, hon. sec. for the Midland district; F. Ashmead, Bristol; J. Allison, Manchester; R. Vawser, Manchester; C. Jones, Ealing; T. Cole, Westminster; T. T. Allen Stratford-on-Avon; H. P. Boulnois, Exeter; J. W. Brown, Aston Manor; G. Cole, Hereford; J. Cook, North Brierley; J. H. Cox, Bradford; B. C. Cross, Dewsbury; A. T. Davis, Solihull; J. T. Eayres, West Bromwich; E. B. Ellice Clark, Hove; J. Gordon, Leicester; R. Hodge, Plymouth; G. Jennings, Rotherham; G. B. Jerram, Walthamstow; J. Lobley, Hanley; H. V. McKie, Carlisle; A. W. Parry, Reading; J. P. Spencer, Tynemouth; G. E. Thomas, Wolverhampton; S. E. Thorold, South Stockton; W. H. White, Oxford; T. W. Bayliss, Redditch; J. Cartwright, Bury; T. Broughton, Warwick; T. Gledhill, Heckmondwike; D. Hildred, Batley; G. W. Sadler, Cheltenham; H. Mitchell, Hyde; J. H. Hall, Liverpool; J. Devis, Oldbury; W. J. Boys, Walsall; W. Blackshaw, Congleton; A. Crier, Lancaster; J. H. Burton, Audenshaw; and J. W. Fereday.

The annual report, which was read by Mr. Cole, stated that twenty-five new members had joined the association this year, three members had died, and the total membership now numbered 204. The members were urged to make every effort to increase the roll of the association.

The report was adopted, and Mr. Morant then vacated the chair, which was taken by Mr. W. S. Till, president-elect for the ensuing year.

Mr. Till, in his presidential address, expressed the hope that during this, the third visit of the association to the borough of Birmingham, some useful information might be gained by the members, and that the objects of the association,—the dissemination amongst the members of that knowledge and practice which fell within the department of an engineer or surveyor engaged in the discharge of his duties under the local and public Acts of Parliament,—might be attained. He had, therefore, prepared a brief description of the borough, together with information as to its streets, night-soil, and sewage works, that he thought would be interesting to the meeting. After giving various statistics as to the former points, Mr. Till explained the sewage arrangements. The Council in 1872, with the view of reducing the difficulties connected with the treatment of the sewage at Saltley, decided upon the introduction of the pan system for collecting night-soil, and at the end of last year there were about 32,000 pails in the borough, estimated to provide for about 250,000 persons. There were about 1,000 water-closets, and the remainder of the population were supplied with the old form of combined privy and ashpit. The cost of the night-soil department in 1880 was 42,996*l.* 17*s.* 5*d.*, of which 27,196*l.* 2*s.* 2*d.* was for collection, &c., of pail contents, and the remainder for the removal of old night-soil; the receipts for the pail contents were 5,702*l.* 3*s.* 1*d.*, and for old nightsoil 1,992*l.* 8*s.* 7*d.*, or a nett cost to the borough of 35,296*l.* 5*s.* 9*d.* The drainage of the borough was commenced in 1852 by the construction of the Hockley Brook and the River Rea main intercepting sewers, under the superintendence of Mr. Pigott Smith. The total length of sewers now under the care of the Corporation was about 175½ miles. The history of the treatment and disposal of the sewage had until recently been one of difficulty and opposition. In consequence of the proceedings instituted by Sir C. B. Adderley, the Public Works Committee, which had the matter then in hand, presented a report to the Council in June, 1871, recommending the acquisition of from 2,000 to 2,500 acres of land down the Tame Valley; but this being considered too costly, the Corporation, on the recommendation of the Sewerage Committee, promoted a Bill in Parliament, in 1872, for the purchase of 800 acres of the same land near Kingsbury, about eight miles below the present outlet. Owing to the lengthened opposition of the landowners in the neighbourhood, the Bill was thrown out on the third reading. To satisfy the requirements of the neighbourhood, the lime process was at once adopted, and more land was obtained at Saltley, and four additional sets of subsidiary tanks were constructed, to which another large tank had recently been added. Upon the United Drainage Board, which was formed in 1877, now devolved the duty of treating and purifying the sewage delivered by the various constituent authorities at the outlet works. The area of the present Saltley Farm was 272 acres, of which 170 was freehold. The three large tanks and sixteen smaller ones had a capacity of 43,310 cubic yards, or about 7,300,000 gallons. The amount of sludge deposited in the tanks during 1880 was 1,784,000 cubic yards, or about 490 cubic yards per day, and required an area of 53½ acres of land for digging in the same, or rather more than one acre per week. The average dry-weather flow of sewage was about thirteen million gallons per day, the population contributing to that amount being roughly estimated at 450,000, being about 29 gallons per head. A little over 13 tons of lime were used per day, the lime being slacked and ground with water under edge-runners. No nuisance arose from the present method of dealing with the sludge, as was sufficiently proved by the fact that there were nearly 3,000 houses within half a mile of the boundary, and no complaints were made by the inhabitants as to the operations now carried on. Mr. Till concluded his address by assuring the meeting of his anxiety to do all he could for the benefit of the association.

Votes of thanks were accorded to the past president and to Mr. Till for his address.

Several amendments of the rules were discussed. It was resolved to limit membership to the chief officers of corporations and sanitary authorities, and that members who after 1881 ceased to hold any public appointment should be eligible for re-election, but disqualified from holding any office under the association.

The members then visited and inspected the outfall sewage works and sewage farm of the Birmingham Tame and Rea District Drainage Board at Saltley, being met by Alderman Avery (Chairman of the Board), who accompanied the party over the works. The intercepting works in Montague-street were subsequently inspected.

The proceedings of the morning sitting on Friday, the 8th, were opened with a discussion as to the works of the Birmingham Corporation visited on the previous day.

Mr. J. Lemon (Southampton) said he must enter his protest against what he considered one of the most disgraceful exhibitions of sanitary work he had seen. He referred to the intercepting works at Montague-street. He wanted to know why there should be one system for the rich and another for the poor, and he hoped the Corporation would see their present folly, and would at no distant date altogether remove that Montague-street abomination. The present system of the Corporation was most insanitary and expensive. It meant that out of the population of Birmingham, 300,000 persons were using the pail system, and about 100,000 were using water-closets. Judging by the mileage of sewers, he supposed the town was tolerably well drained, and why should they not, therefore, take away the excreta at the time the slops were removed? No larger area was required than to take away the slops only, and the objection on the ground of expense was absurd, and required no answer. The only advantage alleged to be possessed by the system in Birmingham was that the excreta was got rid of at the outfall, but he pointed out that they did not evade the cost of removal, for the Corporation paid 35,000*l.* per annum for this. The system of sewers existing in the town was fully capable of removing by water-carriage the whole of the excreta of the borough with more efficiency and less nuisance. The present mode was likely to spread disease, and was, therefore, revolting to every sanitarian. He was at loss to know why the Corporation carried it on, and he felt it his duty to call upon the members to speak openly and fearlessly against one of the most abominable systems in this country.

Mr. Gledhill (Heckmondwike), speaking more particularly with regard to the disinfection of material collected, said he should be very sorry to recommend his Board to follow the example of Birmingham.

Mr. E. B. Ellice Clark (Hove) similarly condemned the system of Birmingham, though he admitted it had obtained its greatest possible advantages in that town. In Liverpool and other large towns the water-carriage system was carried out in its entirety. This was proof that the system could be used by the poor people anywhere. It was difficult to understand why the pail system was being continued. They could hardly imagine it was the pet hobby of an individual, but it was extraordinary that year after year should pass by, and the system should be developing itself all over the North of England, without some statistics as to its superiority over water-carriage.

Mr. J. Lobley (Hanley) urged that the cost of the removal of the pails was money entirely thrown away.

Mr. C. Jones (Ealing), general hon. sec., followed on similar lines, expressing his regret they had heard no defence of the pail system. He confessed the state of things existing in Birmingham was utterly inexplicable to him. Remembering that the system was conducted by gentlemen of position, influence, and scientific knowledge, it staggered him to find how they differed with him upon a question of so much propriety, and he used this word with the fullest meaning. He must, in common with his professional brethren, put his veto on the Association in any way, directly or indirectly, supporting a system which they regarded as so crude, not to say rude, immoral, and bad. Though carried out in the best possible way, the system was still bad in the fullest sense of the word.

Mr. Lewis Angell (London) regarded the pail system of Birmingham as thoroughly degrading and demoralising in every possible way, affording a most disgusting occupation for a number of people, and an admirable system, even if carried out as they saw it on the previous day, for disseminating disease in all directions.

Mr. E. Pritchard (secretary of the Midland Counties District) expressed his disapproval of the system of interception and pan removal.

Mr. J. G. Lynde (Manchester) and Mr. J. Gordon (Leicester) having continued the discussion,

Mr. R. F. Martineau, who was present as a visitor, said on behalf of the committee that he was prepared to defend the pail system tooth

* *Builder*, vol. xxxvii. (1879), p. 239.

and nail. The members of the Association must recollect the circumstances of Birmingham under which the pail system was adopted. When the enormous population of Birmingham and its rapid growth were considered, he thought the engineers present would recognise the immense cost that would have been necessary to obtain land enough to treat properly the whole of the sewage. With reference to the water-closet system, he supposed it must be a matter of the greatest possible difficulty, if not one of impossibility, for the people in the poorer portions of the town to keep the water-closets in such order that smells should not enter the house. How defects could be possibly attended to where such carelessness and ignorance existed, was entirely a mystery to him. Replying to the accusations as to the dissemination of disease by means of the collection of miscellaneous refuse, Mr. Martineau quoted numerous statistics showing the improvement in the death-rate of the borough, especially with respect to zymotic diseases.

The discussion then closed, and a vote of thanks was accorded to Alderman Avery and the members of the committee for their kindness and courtesy to the members of the Association on the previous day.

THE SANITARY SUPERVISION OF DWELLINGS.

Mr. Lewis Angell read a paper on "The Sanitary Supervision of Dwellings." He pointed out that the demand for sanitary supervision had recently found expression in the establishment of societies for sanitary inspection on co-operative principles. The fact of the existence of such societies, be they due to philanthropy or stock-jobbing, raised the great question,—Is such sanitary supervision necessary; and, if this be granted, by whom should it be conducted? That supervision was necessary would be admitted by all who had any official experience. Thousands of houses were annually put together in a manner dangerous to the lives of the occupants, and formed a combination of contaminating influences which lower vitality and endanger life. The result is due as much to ignorance as to carelessnessness, a concourse of fortuitous evils rather than a conspiracy, although, he regretted to add, as the result of official experience, that in many instances it was also the result of the most wilful and wicked cupidity. The Local Government Board recently issued a series of model by-laws for buildings, involving very much detail. He would gladly have urged their adoption by his Board (West Ham, Essex) had he not felt there was no chance of their general observance, over a district of 7¼ square miles, with the staff at his disposal. The imposition of building fees was urged for the provision of the necessary staff, but refused to the applicants. To a condition of things such as he described, in houses new and old, were undoubtedly due the lassitude, the illness, and the deaths of thousands, whose inherent power of resistance was unequal to the fight. Having shown that sanitary supervision was needed, he urged that it was equally obvious the work should be a public and an official one, and not undertaken by amateur or stock-jobbing companies, whose philanthropy was confined to shareholders. Unlike the more advanced public opinion in America, where official factory inspection had been extended to tenement houses, the British ratepayer was not sufficiently educated in sanitary principles. He submitted that a more efficient and extended supervision of the sanitary and constructive details of all dwellings was necessary; that such supervision should be conducted by the responsible officers of the Local Sanitary Authority, and not left to private commercial enterprise; and that it was just that fees be imposed on all new buildings to provide the cost of such supervision. He declared, however, that there was more hope in education than in officialism.

Mr. E. B. Ellice Clark (Hove) said great difficulties had to be encountered before an effectual supervision could be exercised throughout the country. The Government standard of what that supervision should be had been by no means reached in all places. It would be impossible in some towns to insist on stringent sanitary provisions, however necessary; but it should be the aim of the municipal surveyor to gradually work up to the standard required. Dealing with what should be supervised, he urged that where the inspection staff is limited, the four cardinal points for supervision should be:—(1) the structure of walls, roofs, foundations, and spouts of new buildings, for securing health and stability and the prevention of fires; (2) sufficiency of space about new buildings to secure a free circulation of air; (3) ventilation and drainage of new buildings; and (4) closing of buildings, or parts of such, when unfit for human habitation, and prohibition of their use. All these points were empowered by the Public Health Act, but if the requirements of modern sanitarians were to be met there should also be subject to supervision and control the height of rooms, thickness of floors, physical conditions of the site as to floods, whether from sewers or watercourses, works necessary to be carried out in the distribution of water for dietetic purposes, and many other matters necessary to place a house in a good sanitary condition. Supervision, to be of any value, must be exact and impartial. If coercive laws were to be carried out, no discretionary power should be left in the hands of local authorities or officials, such discretion being open to serious objections. As to the probability of the detailed model by-laws being stringently enforced on the community, Mr. Ellice Clark said they might fairly assume a higher state of health, morality, and civilisation, but they must, in exercising something akin to parental control, take care that individual responsibility was not removed from the shoulders of the builders and work-people to that of the officials. Individual responsibility brought self-reliance, and whatever restrictions were placed on buildings, or whatever supervision was exercised, it must always be borne in mind that the condition of a building is the responsibility of the builder.

Mr. J. G. Lynde (Manchester) stated that supervision, in which was included most of the points recommended by Mr. Angell, had been in force in Manchester for several years past. A certificate was given by the City Surveyor to the effect that the by-laws had been complied with before a house could be occupied. This was done without any cost to the builders, and he thought the system of fees objectionable.

Mr. Ashmead (Bristol) said that by virtue of a special Act, supervision had been increased in Bristol for many years, a special charge being made to the builders for the certificate that the conditions had been complied with.

A paper was also read by Mr. R. Vawser on "Rivers Conservancy." He expressed a belief that the present Bill for the improvement of rivers and prevention of floods is drawn with due regard to all existing and vested interests, and contains all the essential elements of a most useful measure, and as such deserves the earnest support of sanitary authorities.

On Saturday the members of the Association paid a visit to the Birmingham gasworks.

THE CORINTH CANAL.

THE concession granted to M. De Lesseps and General Türr to cut a canal through the Isthmus of Corinth has recalled the fact that this is not the first time the project has been started. The *Hora* of Athens, in an historical retrospect of former attempts, points out that the first recorded instance of the idea being seriously taken up dates back nearly 2,500 years ago. According to Diogenes Laërtius, the Tyrant Periander of Corinth, about the year 625 B.C., made some practical preparations with a view to digging a canal across the Isthmus. The scheme, however, came to nothing. At a subsequent period the same plan, according to Strabo, was revived by Demetrius Poliorcetes. He was, however, deterred from attempting its execution by the reports of his engineers who declared that the waters of the Gulf of Corinth itself stood at so much higher a level than those of the Saronic Gulf on the other side of the Isthmus that their connexion by means of the proposed canal would inevitably overwhelm and destroy Ægina and the adjacent islands. This instance of the ignorance prevailing in ancient times will appear all the more pardonable when it is remembered that similar fears for a long time contributed in recent days to discourage the attempt to pierce the Isthmuses of Suez and Panama. The next to take up the Isthmus of Corinth Canal scheme was no less a personage than Julius Cæsar. That Roman general instructed an engineer, Anienus by name, to survey the ground, and, if practicable, to carry out the work. The death of Cæsar, however, occurred before a sod was turned, and nearly a century elapsed before the plan was again revived. Suetonius tells us that the Emperor Caligula contemplated solving the problem, and actually despatched a centurion to study the *terrain* and make everything ready for beginning the excavations. Caligula, however, passed away, and nothing further was done in his reign.

It was under the Emperor Nero that the first actual digging operations were commenced. That sovereign, half genius, half madman, himself proceeded to the isthmus, and set 6,000 Jewish slaves, together with numerous gangs of convicts, to work in making the canal under his own personal supervision. The operations, however, had not been long commenced before they had to be entirely suspended owing to the formidable insurrection under Julius Vindex. The work was never resumed. The traces of the excavations commenced by Nero, nevertheless, are still visible to this day, more especially near the Diolkos. Afterwards Herodes Atticus, the benefactor of Athens, designed taking up the work left undone by Nero; but in the end he was afraid, as a private gentleman, to undertake a work of such magnitude,—a work which even emperors had tried and failed at. Thus all the attempts made in ancient times came practically to nothing. The only result was to confirm the popular belief that the project was not only impracticable, but was an impiety against the gods. Tacitus speaks of those who "would pierce the isthmus with a navigable channel," as "hankering after things unheard of or past belief." The failure of all attempts was popularly attributed to the displeasure of the gods, "as is plainly evident from the result," says the historian just cited. Dio Cassius reports that at the time of Nero's attempt there were numerous terrible signs and portents, showing the disapproval of the deities. It was a widespread superstition that to endeavour to change the relations between the land and the sea as presented by Nature was nothing less than an impious attempt to disobey and thwart the will of the gods. In reference to the design once entertained by the people of Cnidus to cut through their peninsula, Herodotus reports the following as the reply given by the oracle to their inquiry on the subject: "Neither fortify nor pierce through the isthmus, for Zeus would have made it an island if he had so willed."

WORKS IN EDINBURGH.

IN order to expedite the restoration of the remainder of St. Giles's Cathedral, Dr. William Chambers (at whose cost the restoration is being carried out) has secured an iron church for the temporary use of the congregation at present occupying the nave, until such time as their new church at Meadow-place is built. The erection of the temporary church is being rapidly proceeded with, upon a site granted by the Town Council, at the east end of the Links, so that the restoration of the nave and north transept of the cathedral may not be delayed. The restoration has been entrusted to Mr. Hay, architect, who carried out the works in the choir and south transept, and a similar course is to be adopted with the remainder as was pursued in regard to these portions. The pews, galleries, and other interior fittings are to be removed, the plaster taken from the walls, and the masonry cleaned and re-dressed, and defects supplied where necessary. The walls which divide the north transept from the nave, choir, and south transept will, as a matter of course, be pulled down, so that an unobstructed view of the whole area may be obtained. The low plaster ceiling under the crossing will also disappear, and a new ceiling of uniform height with those of the nave and choir be substituted. The doors at the west end and north transept, which were the work of Mr. Burn, are to be superseded by others of new and appropriate design. The western door is to be deeply recessed, and richly moulded and carved, and divided into two by a stone pier. The northern door is to be similarly treated, and an inner porch formed by the erection of a stone screen across the whole width of the transept. The pillars and arches which support the tower are perfectly secure, but a good deal will require to be done to them in the way of restoration of detail. The mural monuments in the north transept are to be removed to suitable positions in the south aisle of the nave.

In a limited competition for a new Free Church, to be erected in Easter-road, immediately adjoining the Episcopal Chapel designed by Mr. H. J. Blanc, the designs by Mr. Charles S.

Johnston, architect, have been chosen. In this instance the committee were guided by the advice of an expert, the favourite design, we understand, having been put aside as being likely to cost considerably more than the stipulated sum. The church and adjuncts have a frontage of 70 ft., and an average depth of 115 ft. The interior of the church, consisting of nave and isles, measures 73 ft. by 47 ft., and, including the accommodation provided in a gallery at the west end, there are sittings for 750 persons. The east end is apsidal, and groined in wood. The arcades separating the nave from the aisles are formed by iron columns supporting timber arches, the spandrels of which are pierced by circles and cinquefoils; and over the arcades there is a timber clearstory, with cusp-headed windows arranged in groups of three. The west elevation consists of three parts,—central gable, tower and spire, and turret containing staircase to gallery. In the central gable there is a three-light window with geometrical tracery, beneath which is the doorway, flanked by two small windows on each side. The tower and spire terminate at a height of 85 ft., and the turret containing the stair to the gallery is finished by a gabled roof, and is separated from the main gable by a buttress. The side walls are without buttresses, and rise to a height of 16 ft. above the floor level; at the west end they are pierced by double and triple light windows above and below the gallery level, the other windows being narrow splayed and pointed openings. The estimated cost of the buildings, including a hall, 36 ft. by 26 ft., session-house, 19 ft. by 15 ft., vestry, 12 ft. by 10 ft., and other adjuncts, is 3,500*l.* The church is to be dedicated to the memory of the late popular and eloquent Dr. Thomas Guthrie.

The plans for the new portion of the Calton Gaol, prepared by Major-General Collinson, have been approved of by the Home Secretary, and the Prison Commissioners have been authorised to proceed with the construction of the buildings. The style adopted is Castellated, in unison with the existing buildings. The new works will consist of two divisions. In the one accommodation will be provided for 52 male and 87 female prisoners, and in the other for 162 male prisoners. The heating apparatus, kitchen, bakery, &c., will be placed between these two blocks. The court-yard will be increased by throwing back the boundary-wall to within 10 ft. of the outer iron railing, and a new entrance-porch will be formed, and accommodation provided for the female officials. The present west division will be altered by throwing two cells into one, by which means the Government requirement as to space will be amply met. This portion will be occupied by female prisoners, and not by males, as hitherto.

The municipal authorities having called upon sculptors to submit designs for statues and statuettes for the vacant niches in the Scott Monument, upwards of sixty competitors submitted designs. The figures are to be executed in freestone, and it has been resolved to give commissions for eight large statues, at a cost of 52*l.* 10*s.* each, and twenty-four small ones, at 25*l.* each. The following are the sculptors selected and the subjects entrusted to them:—For the large niches,—Balfour of Burleigh and the Knight Templar, W. B. Rhind; Rob Roy and Ivanhoe, John Rhind. For the small niches,—Peter Peebles and Montrose, D. W. Hutchison; Julia Mannering, George Webster; Davie Deans, Effie Deans, and Lady Avenel, J. S. Burnet; Percy Shafton, Clark Stanton; the Dougald Crater, Charles Macbride; Weyland Smith, J. S. Gibson; Gurth, W. Sheriffs; Queen Elizabeth, W. Walker; the Abbess and Caleb Balderstone, W. G. Stevenson; Rose Bradwarden, D. Buchanan; Dirk Hatteraick and Claverhouse, W. B. Rhind; Dugald Dalgetty, Ravenswood, Lady Rowena, Ritchie Moniplies, and Lucy Ashton, J. Rhind; Constance, Fraser Tytler. To Mr. Brodie, R.S.A., has been entrusted the characters of Helen Macgregor and Cromwell, for large niches; and Madge Wildfire for a small one; and to Mr. Hutchinson, R.S.A., the characters of John Knox and Charles I. for the large niches, and George Buchanan for a small one. The figures are to be delivered by the 1st of March next.

The tower of the Corn Exchange, in the Grassmarket, is to be furnished with a clock, at the cost of 90*l.*, the hours to be struck upon the bell now in the tower. The dials are to be illuminated by a self-lighting machine, adapted to suit the variation in the length of the days and nights.

It has been resolved by the Plans and Works Committee of the Town Council to make a charge of 2*s.* 6*d.* per annum upon each pole sanctioned for the erection of telephone wires. Reference was made to the probable danger incurred by such wires overhead, but no resolution was come to on the subject.

The Municipality have secured a lease of seventeen acres of ground at Merchiston for a period of five years, at a rental of 10*l.* per acre, to be used as a public park. The ground is in the neighbourhood of Fountainbridge and Dalry, where a large number of dwellings for the working-classes have been erected of late years. Much care and taste has been displayed in the planting-out of the public gardens, and the rich masses of foliage upon the trees has at present a very fine effect. Edinburgh always appears to best advantage at this season of the year. Albeit, the late east winds have been more trying than usual to feeble constitutions.

A committee of gentlemen connected with the district of Morningside have acquired the United Presbyterian Church there, which is to be vacated in the month of October next by the congregation, who remove to the large and handsome church over the way, designed by Mr. David Robertson. The church is to be converted into a literary institute, comprising a lecture-hall, library, reading-room, &c. The purchase-price of the church was 2,000*l.*, and a farther sum of 2,000*l.* is to be expended upon the transformation. To Messrs. Thornton Shiells & Thomson this task has been entrusted, and, looking to the limited amount of the capital at their disposal, it seems a somewhat difficult one. The exterior walls of the church are to be retained as they are, and a floor is to be inserted half-way up, thus converting the building into two flats, the upper one being retained as the lecture-room, and the lower appropriated to the other purposes of the institute. What strikes one at first sight is the fact that a less amount of air and space seems to be considered necessary for an audience listening to a lecture on scientific than for one on religious subjects. The church is by no means of unusual height, and we do not anticipate a satisfactory result, either without or within, from the cheese-paring policy adopted.

The building of the new Conservative Club in Prince's-street has been postponed, owing to a dispute as to the ownership of a lane in rear of the site.

There is a large and very handsome church in course of erection at Tynecastle. It is for a congregation in connexion with the Establishment, at present worshipping in an iron church in the immediate vicinity. Mr. Honeyman, of Glasgow, is the architect.

We learn that another church is contemplated by the Church of Scotland for the district of Inverleith and Goldenacre. These new churches are consequent upon the increase of population in the respective districts. The number of churches in the suburbs of Edinburgh will soon be subject of remark. There seems to be no want of zeal in church-building, whatever may be said by those who should know best as to the decay of true piety.

RESTORATIONS IN ITALY.

IT is well known that in consequence of the loud remonstrances from without, as well as from those at home who are really interested in the restoration of ancient monuments in Italy, a Commission was formed last winter with De Sanctis, the then Minister of Public Instruction, at the head, and who is now replaced by Bacelli, to watch over the restorations undertaken. The work had previously been entrusted to civil engineers, men well versed, no doubt, in the mechanical work of their profession, but not necessarily men of artistic perceptions. Many travellers, having for their goal Florence or Rome, pass the interesting town of Pistoia, and miss seeing the many objects of great interest it contains,—its grand old Duomo, with endless bits of Mediæval architecture and sculpture, and its curious old pulpit on the exterior of the building, and the grandly sculptured pulpits in the churches of San Andrea and San Bartolommeo-in-Pantano, besides the picturesque town-hall, &c.

The hospital of Del Ceppo was founded about 1277. The cornice of the façade is adorned by one of the most magnificent works of Della Robbia. This work was added about 1525, and is now about to undergo restoration. The Pistoians, wishing to record the works of charity performed by their citizen-bishop, Andrea Franchi, of the Dominican order of priesthood, had this splendid ornament added to their hospital. It is one of the most splendid works of glazed terra-cotta existing, of the old Luca di Simone della Robbia work. Which of the Della Robbias was the author no existing document relates. It is generally attributed to Andrea, grandson of the old Luca, the same who, up to 1505, superintended the work of the ornaments in front of the gallery of the cathedral. He may have been aided in the work by his three sons, Luca, Giovanni, and Girolamo, since the receipt of certain sums is found in the archives of the hospital signed by Giovanni, who had paid the same to Andrea di Marchi in 1525, the time of the making of the ornament. The work represents the seven acts of charity,—clothing the naked, visiting the imprisoned, giving to eat and drink to the needy, &c. Each compartment is divided by pilasters of deep blue colour, with ornaments in high relief in white. The figures are perfectly modelled, in the highest possible relief, full of beauty and grace and touching expression. At each point where the arches that support the gallery join, are three medallions, representing the Annunciation, the coronation of the virgin, and the visit of St. Elizabeth, each surrounded by frameworks of fruit and flowers. Four figures representing Faith, Prudence, Hope, and Charity, are between the ornaments of the loggia or gallery. The arms of the Medici, of the city, and of the hospital, are discovered among the adornments. This great work of art is one of which any city may be justly proud, and it is devoutly to be hoped that the Minister Bacelli will be happy in the selection of the persons destined to superintend its restoration.

THE MINING DEATH-RATE.

THE reports of the Inspector of Mines for the past year show that the heavy mining fatalities have caused marked differences in the death-rate of the coal-yielding districts. In 1879, South Durham district had the loss of one life to every 885 persons employed at or in the mines, whilst the volume just issued shows that one life was lost for every 220 persons employed last year. Northumberland, North and East Lancashire, Derbyshire, Yorkshire, South Staffordshire, Monmouth, Scotland, and South Wales have in the year gained in safety in proportion to the number of miners employed; but in North Staffordshire, Cleveland, and one or two other districts, there has been slightly more loss of life in proportion to the persons employed. The general results are, that whilst in 1879 there were 490 persons employed in and about the coal mines of the kingdom for every life lost, last year there were 368 persons only employed for every life lost. As to the tonnage results, in 1879 there were extracted 149,400 tons of mineral for every life lost, last year 122,509 tons only being extracted for each life, the serious colliery explosions at Seaham and in the Welsh districts having chiefly caused the change. In consequence of these losses, there is for the past year one of the heaviest reports of mining mortality that has been given since the introduction of the system of inspection. Not less than 1,318 lives were lost by accident in the mines registered under the Coal Mines Act, the number for the previous year being 973. The great bulk of the increase is to be found in the fact that the lives lost by explosions of fire-damp have risen from 184 in the year 1879 to 499 last year,—the Seaham explosion contributing 164 to that number. This and other heavy losses have probably contributed to bring forward from the mine inspectors in their reports a number of opinions that will in all probability have weight in future legislation. Mr. Wynn condemns blasting in fiery mines. He says that "no care or attention which can be bestowed upon the ventilation of a fiery mine can make the use of powder at all times safe." Mr. Alexander states that the use of loose gunpowder is responsible for over 7 per cent. of the accidents that took place in the past year. Mr. Wales expresses the opinion that "all the South Wales steam coals should be worked exclusively with locked safety-lamps, and shot firing strictly prohibited." Other inspectors join in this expression of opinion, and it may be said to be substantially that of the mining inspectors. One of these gentlemen states that he has "warned the public and the authorities of this terrible danger" long and often, and that

thus the responsibility for the continuance of the system of shot-firing "rests with others." It is evident that the mining inspectors are now convinced of the folly of this most "wasteful system of coal winning," and that it rests with the public to say how long it shall continue, and how long other efforts to minimise the loss of life in coal winning shall be in some years rendered of little avail. For years there has been a gradual descent in the loss of life in the coal mines; but it has been checked by the growth of the number of lives lost by falls of the roof and sides of parts of the pit, and especially by the exceptional mortality in several years by the heavy fatalities that have occurred in different parts of the country by explosions of fire-damp, and by allied or following causes. When there is a consensus of opinion against a practice which is supposed to very materially contribute to that loss of life from that one cause, it is worth the consideration of the public whether a stop should not be put to it, and whether that "responsibility" resting on the public should not be dealt with and removed.

ORNAMENTAL AND DECORATIVE ART EXHIBITION, LISBON.

AN exhibition is to be opened in the National Museum of Fine Arts in Lisbon, of the Spanish and Portuguese ornamental and decorative arts, practised from the remotest period of antiquity to the end of the eighteenth century in those countries. In addition to the articles exhibited in the South Kensington Museum, of Spanish and Portuguese origin, there will also be exhibited others possessing the highest artistic value, belonging to various corporate bodies and private persons, which, on account of the danger of breakage and injury in their transmission to London, could not be exhibited in the South Kensington exhibition. Various other objects, which were collected by the several committees for the purpose of transmission to London, will also be exhibited on this occasion. The exhibition will also admit any articles of art existing in Portugal and Spain, without reference to their origin, provided they are works of a period anterior to the commencement of the present century. The exhibition will be opened in November next, and it will continue to the end of January, 1882. The President of the Commission of this exhibition is Prince D. Fernando II., father of the present king of Portugal, and the members who compose the Commission consist of the highest nobility and men of letters in Portugal.

PRIZES: INSTITUTION OF CIVIL ENGINEERS.

FOR some of the communications presented during the recent session, the Council of this incorporated society have just awarded premiums and prizes, arising out of various trust funds, including the following:—

For Papers read at the Ordinary Meetings.

1. George Stephenson medals and Telford premiums to Thomas Forster Brown and George Frederick Adams, MM. Inst. C.E., for their paper on, "Deep Winning of Coal in South Wales."
2. A Watt medal and a Telford premium to John Isaac Thorneycroft, M. Inst. C.E., for his paper on "Torpedo Boats and Light Yachts for High-speed Steam Navigation."
3. A Telford medal and a Telford premium to Theophilus Seyrig, M. Inst. C.E., for his paper on "Different Modes of Erecting Iron Bridges."
4. A Telford medal and a Telford premium to Max am Ende, Assoc. M. Inst. C.E., for his paper on "The Weight and Limiting Dimensions of Girder Bridges."
5. A George Stephenson medal and a Telford premium to Benjamin Baker, M. Inst. C.E., for his paper on "The Actual Lateral Pressure of Earthwork."
6. A Telford premium to Richard Henry Brunton, M. Inst. C.E., for his paper on "The Production of Paraffin and Paraffin Oils."
7. A Telford premium to Charles Colson, Assoc. M. Inst. C.E., for his Paper on "Portsmouth Dockyard Extension Works."
8. A Telford premium to Christian Hendrick Meyer, Assoc. M. Inst. C.E., for his Paper on the "Temporary Works and Plant at the Portsmouth Dockyard Extension."
9. A Telford premium to Benjamin Walker, M. Inst. C.E., for his Paper on "Machinery for Steel-making by the Bessemer and the Siemens processes."
10. The Manby premium to Joseph Prime Maxwell, Assoc. M. Inst. C.E., for his Paper on "New Zealand Government Railways."

Christmas and New Year's Cards.—A great competition in designs for such cards has been induced by Messrs. Hildersheimer & Co., and the specimens submitted are now on view at the Egyptian Hall, Piccadilly.

THE GREAT EASTERN HOTEL.

THE Great Eastern Railway Company will, in a short time, be in possession of one of the largest and most costly hotels in the metropolis. It is being erected immediately adjoining the approaches to the Liverpool-street Station, and will have a frontage to Liverpool-street of 280 ft., extending from the general offices of the Company to Bishopsgate-street, having a handsome elevation to that thoroughfare of 50 ft. in length. The preliminary excavations and the construction of the building up to the ground-line at the east end of Liverpool-street and Bishopsgate-street have formed a heavy portion of the work. In this portion of the structure there are a basement and a sub-basement, carried to a depth of 30 ft. below the pavement level. The spacious vaults for storage purposes, together with an immense kitchen, and numerous other apartments in connexion with the culinary department of the hotel, have been constructed, the walls of all these several apartments being faced with white enamelled brick. The sub-basement has a concrete floor 6 ft. in thickness, whilst the floor above it is fire-proof. In the construction of this underground portion of the hotel, upwards of a million of bricks have been used, and the superstructure is now making rapid progress. The two elevations of the hotel will be entirely in Portland and Corsehill stone. The Bishopsgate-street frontage will have a commanding appearance, containing five lofty stories above the ground-floor. There will also be a return frontage in Liverpool-street of almost equal length with the Bishopsgate-street elevation, and of uniform design. In consequence of rights of ancient lights interfering as respects some buildings at the rear, a portion of the Liverpool-street frontage will not be carried up beyond a height of between 60 ft. and 70 ft. From Liverpool-street the hotel will be carried in the direction of the station area to a depth of 114 ft., being built upon strong iron girders extending the entire width of the station itself, which the windows at the rear of the hotel will overlook. All the girders which support the superstructure will be supported by iron columns 2 ft. 6 in. in diameter, and massive piers in blue Staffordshire brick, with iron stanchions. There will be a balcony extending entirely across the station frontage of the hotel, which will be approached from the station area by two staircases from the arrival and departure platforms respectively. There will also be lifts for passengers' luggage to and from the hotel, both on the arrival and departure platforms. In about the centre of the Liverpool-street frontage an ornamental archway, 25 ft. in width, having massive carved and moulded piers in Portland stone, will lead down to a covered cab-rank on the railway level. The principal entrance to the hotel will be from the Liverpool-street frontage, the ground-floor portion of which will consist of shops, but there will likewise be another entrance in Bishopsgate-street.

The architect of the hotel is Mr. C. E. Barry, and the contractors are Messrs. Bangs & Co. Mr. W. T. Vale is clerk of the works. The iron girders across and over the line, on which the hotel will rest, were erected under the immediate superintendence of Mr. Alfred Langley, the company's engineer-in-chief.

THE NEW THEATRE IN NORTHUMBERLAND AVENUE.

AFTER remaining in abeyance for several months past, the works at Mr. Sefton Parry's new theatre in Northumberland-avenue have this week been resumed, and the building will now be actively proceeded with, and, as we are informed, will be opened before the close of the year. It may be remembered that the stoppage of the works at the theatre was owing to the action taken by the directors of the South-Eastern Railway Company, who during the time the foundations of the theatre were in course of construction, entered into negotiations with Mr. Sefton Parry for the purchase of his interest in the site, with the view of obtaining powers for the extension of their Charing-cross station in that direction. It was understood that these negotiations resulted in the company buying Mr. Sefton Parry out, but prior to their being ratified, the railway company took a course hostile to Mr. Parry, by applying to the Master of the Rolls for an injunction against his proceeding with the erection of the theatre on the ground that the construction of the foundations adjoining the railway station was undermining the west wall of that structure. The injunction was refused, with costs against the railway company, and as the company have since declined to complete the purchase bargain originally entered into, the erection of the theatre as at first intended follows. It is to have elevations to Northumberland-avenue and the Embankment, the latter being circular in form.

Messrs. Fowler & Hill are the architects of the theatre; and Messrs. Kirk & Randall the contractors.

ARCHITECTURAL SCHOOL, ROYAL ACADEMY.

THE following were admitted, July, 1881, to the Architectural School:—

To Upper School.—F. B. Bare, W. Bucknall, J. H. Curry, B. Dickson, E. G. Hardy, W. H. Lethaby, G. H. Shackle.

To Lower School.—G. Blisard, G. C. Horsley, H. H. Kemp, A. Kent, A. Leslie, H. W. K. Martin, H. G. Nixon, H. Read, T. Sims, J. A. Slater, R. E. Smith, C. H. Stock, W. Toogood.

Probationers.—G. W. M. Addison, R. T. Blomfield, W. M. H. Burkitt, F. Dickenson, H. Field, E. A. Jackson, F. Johnson, G. E. T. Laurence, T. Maclaren, G. T. Oakeshott, S. Gambier Parry, F. Landers, A. D. Smith, Kingo Tatsano, Thomas Ward.

COMPETITIONS.

Corporation Market, Birmingham. — The limited competition for new buildings in connexion with Smithfield Market, St. Martin's-lane, has now been decided. The competing architects were Messrs. Osborn & Reading, Messrs. Bland & Cossins, and Messrs. Martin & Chamberlain. The design submitted by Messrs. Osborn & Reading has been selected.

Forest of Dean Board Schools.—In the competition for Steam Mills Schools, Forest of Dean, Gloucestershire, for 416 children, Joys Green Schools for 274 children, and a separate teacher's residence, the designs of Mr. Alfred Smith have been accepted by the Forest of Dean U.D. School Board for the above works. They have been passed by the Education Department, and are to be proceeded with at once.

PROPOSED TOWN-HALL FOR EASTBOURNE.

AT the last meeting of the Eastbourne Local Board,—

Mr. Schmidt, building surveyor, produced plans for a town-hall at Stock's-bank, to cost about 13,000*l*. One of the principal features is a county court-room, but there are also a board-room and offices. The plan had been submitted to Judge Martineau, who affirmed the same with a few slight alterations.

The question arose whether a portion of the building should be put up first, or the whole work carried out at once. The latter view appeared to be the most general, and on the motion of the Rev. E. E. Crake, it was resolved to invite tenders for the work, and to apply for powers to borrow the additional sum required beyond what the Board has in hand.

A CURIOUS CASE UNDER THE METROPOLITAN BUILDING ACT.

A SOMEWHAT singular case, as illustrating the difficulties arising from rash and ignorant tampering with houses by their tenants, was heard at the Marylebone Police-Court a few days back.

It appeared, from the statement of the district surveyor, Mr. Wallen, that Mr. Dart, of 100, Park-street, Camden Town, had caused an erection or additional story to be built on the flat of the one story addition at the rear of that house, which adjoined another addition also one story high at the rear of No. 101. The district surveyor required that this addition should have a wall on the side next to No. 101, or, in other words, that the party-wall should be carried up above it. This was accordingly done, and the building duly passed. Thereupon the owner or lessee of No. 101 threatened Mr. Dart with legal proceedings for obstruction of light to his rear buildings owing to the new addition at No. 100; and for trespass in raising on the wall which he claimed as his; and Mr. Dart, in the hope of meeting his objection, sent for Mr. Soper, a builder living

close at hand, and desired him to pull down the wall that the district surveyor had required to be raised, and this he accordingly did, without notice to the district surveyor. Then Mr. Dart, wanting an inclosure, put up with his own hands some thin wooden boarding. The district surveyor afterwards discovering the change that had been made, served Mr. Soper with notice to restore the wall, waiving (on Mr. Soper's representation of inadvertence) the penalty for neglect to give notice. A summons was granted, and an order to restore the wall made by the magistrate. Mr. Soper, however, on account of the difficulty of the adjoining owner above referred to, proposed to remove the new erection altogether. But here Mr. Dart found a fresh difficulty in the fact that he had just executed the counterpart of a new lease, under which he was bound to maintain the new erection intact. Mr. Dart, therefore, refused to allow Mr. Soper to enter his premises in order to comply with the magistrates' order, and the latter appealed to the district surveyor, who thereupon commenced proceedings against Mr. Dart for the erection by him of the wooden enclosure. A notice was accordingly served on him to substitute brickwork, and, on failure to comply, a summons was taken out against him. Meantime the action with the adjoining owner came before the Court of Queen's Bench, and is referred to arbitration, and the magistrate adjourned the summons against Mr. Dart pending the decision thereon. Then the accident happened which the regulation, sought to be enforced by the district surveyor, was intended to prevent. A fire occurred at the rear of No. 101, which, owing to the absence of the wall in question, communicated itself to the erection on Mr. Dart's roof, entirely destroying it, and doing considerable damage to the main part of the house, which narrowly escaped destruction.

The adjourned summons against Mr. Dart, and a fresh one taken out by the district surveyor against Mr. Soper for non-compliance with the magistrate's order, was heard on Wednesday, the 22nd ult., when the district surveyor said, as regarded the former, he could hardly proceed—the cause of complaint being destroyed—but suggested that a fine should be inflicted on Mr. Soper for non-compliance with the magistrate's order under the latter summons (which he could recover from Mr. Dart) for the folly and recklessness which had produced the disaster.

Mr. W. M. Miller, solicitor, who appeared for Mr. Dart, pleaded, however, that he was inadequately insured, and would already suffer, whereupon Mr. de Rutzen expressed an opinion that, under all the circumstances, the summons might be withdrawn on payment of costs.

Mr. Dart, however, is still as far from being relieved of the difficulty into which he has got himself as ever. If he does not restore the erection, he forfeits his lease. If he does, the district surveyor immediately requires the raising of the wall, and he is still liable to the proceedings taken against him by the adjoining owner.

The whole should be a warning to shopkeepers and others, who take property on lease, not to tamper with their buildings, as they are so frequently apt to do, without taking proper advice as to the responsibilities they are incurring, or carefully considering the consequences of their actions.

PATENT RECORD.*

ABRIDGMENTS OF SPECIFICATIONS

Published during the Week ending July 2, 1881.

4,153. R. W. Gossage, Deptford. Adjustable apparatus for regulating the position of doors and windows.

This is applicable to windows of the kind termed "French," that open like doors. A cylinder is screwed to the door, within which is a piston actuated by a spiral spring. A spindle is attached to the piston which passes through the inner end of the cylinder, on the end of which is an adjustable nut. A double-armed lever is hinged to the door-post, and the ends of the arms come to the sides of the cylinder, through which they are connected together by a pin, which is made to act on the piston. The position of the door or window, when partly open, is thus regulated by the adjustable nut. Oct. 13th, 1880. Price 6d.

4,177. E. Taylor, Blackburn. Appliance for fire-grates for consuming smoke, &c.

A perforated plate is placed in the flue above the fire in a diagonal position towards the back of the fire, which, becoming hot, burns the smoke as it passes away from the fire, and increases the heat by intercepting it from going up the flue. Oct. 14, 1880. Price 6d.

4,634. J. Jobson, Derby. Open fireplaces.

The back, bottom, and sides are formed of fire-bricks. Passages are made through these, by which air is led to mix with the smoke and consume it. Nov. 11, 1880. Price 8d.

4,714. J. M. Tall, Dulwich. Concrete buildings.

This uses a combination of slabs and blocks formed of concrete. The slabs are made with an enlargement on two opposite edges, and a groove is formed within them. The blocks also have a groove along two edges. When they are placed in position, a grouting of cement is poured into the groove at the joints and allowed to harden. Nov. 16, 1881. Price 6d.

4,752. J. Holgate, Burnley. Cutting or dressing stone, &c.

The stone is placed on a travelling table, and cylinders, which revolve in the same direction, are used to carry different cutters, whereby the stone is cut and dressed in one operation. The cylinders are so geared that they can be raised or lowered together or separately, and the table is made to travel at whatever speed is required. Nov. 18, 1880. Price 6d.

4,761. H. Thompson, Islington. Domestic grates or stoves.

The main portion of the grate being formed in the usual manner, the front bars are made to move vertically in grooves at the sides. The bottom bar has a slot, through which is passed a flat plate, when the whole of the bars and the plate are raised, leaving a space at the bottom of the fire in which fresh fuel may be placed, when the plate is withdrawn, and the bars allowed to drop into their normal positions. Nov. 18, 1880. Price 6d.

4,832. E. Young, Steyning. Wooden pavements.

To prevent horses slipping upon wooden pavements, a nail or spike, on which is a washer, is driven into the upper surface of each block. The washer prevents the nail being driven into the wood, and the head of the nail affords a firm foothold to horses. Nov. 22, 1881. Price 4d.

4,845. W. R. Lake, Southampton Buildings. Furnace or fireplaces.

Air pipes are provided, having their inlet openings in the outer air, which are led into the flue or chimney to receive the heat passing up, and are then coiled round the fire and open into the fire chamber by long narrow mouths, arranged at an angle to the direction of the draught, whereby the smoke and gases are consumed. Several different arrangements for the pipes are shown. (Com. by J. Wolstenholme, Buffalo, U.S.A.) Nov. 23, 1880. Price 6d.

4,853. J. Lovegrove, Lower Clapton. Sewer and drain pipes.

An overflow passage is formed along on the top of the drain, with which it is in communication by small openings. When an obstruction takes place in the pipe, the water will escape upwards into the overflow passage, and after passing the obstruction will flow downwards into the pipe and pass away. In convenient positions along the drain, shafts, partly vertical and partly curved, are placed, divided by two divisions, into three spaces. The two outer divisions are connected by curved pipes to the drain, so that bamboo cane rods can be passed down. The centre space is vertical, and can be used for examination of the drain, &c. Syphon-traps are used for the drain inlets. Nov. 23, 1880. Price 6d.

4,896. H. Hunt, Newington. Combined blower and fire-guard.

A frame is made to fit the fireplace, hinged as required, and transparent mica or talc is inserted therein. Adjustable slides are provided, so that it may be withdrawn a little and act as a fire-guard. (*Pro. pro.*) Nov. 25, 1880. Price 2d.

4,916. W. H. Settle, Horncastle. Manufacture of mosaic or ornamental slabs, tiles, tablets, &c.

A number of glass beads or other suitable materials are secured together by wire, and bedded in a cement backing, which forms the body of the slab, &c. (*Pro. pro.*) Nov. 25, 1880. Price 2d.

* Compiled by Hart & Co., Patent Agents, 28, New Bridge-street, E.C. It is not the fault of Messrs. Hart & Co. that this list has fallen behind-hand.

SANITARY PLUMBING: GULLIES.

SIR,—I have read with great interest Mr. Hellyer's lectures on "Sanitary Plumbing," as reported in the *Builder*, more especially the one on "Traps and Trap-Ventilation," and I fully agree with him in most that he has hitherto said; but I cannot follow him in all that he says respecting the disconnexion of sinks, waste-pipes, &c., and in his sweeping condemnation of the gullies now so generally used for that purpose. Besides, in condemning the Mansergh trap (which, by-the-by, is liked by some eminent sanitarians), Mr. Hellyer condemns all traps or gullies that are not what he terms self-cleansing; but as they are recommended for the disconnexion of sinks, &c., by the great majority of surveyors and engineers, and as they are also recommended in the "Model By-laws" recently issued by the Local Government Board, and as I have seen some thousands fixed which answer their purpose in every particular, I cannot allow Mr. Hellyer's individual opinion to outweigh my own experience and the opinion of so many eminent and practical sanitary engineers. Of course, the construction of a gully is such that there *must* be a certain space where sediment can subside, and there is no doubt that this deposit is not removed so often as it should be from ordinary gullies, but there are some with a movable bottom, which reduces this evil to a minimum; but I am of opinion that it is not an unmixed evil, for there is always a certain quantity of grease and soapy matters from a sink, which, although they will not subside by themselves, are dragged down to the bottom by silth and heavier matters. Mr. Hellyer admits that for yard *detritus* the gully is the proper thing, but when a trap with an open grid is placed outside a house to receive the discharge from the sinks, it more often than not has to serve as a yard gully also.

With respect to self-cleansing traps. I have never yet had the pleasure of seeing one that would really be self-cleansing placed between the sink and the sewer. I can understand that a syphon-trap, with a slow bend, properly fixed, would probably be self-cleansing if the discharge into it could be always direct and in fair quantities, so as to flush it at every discharge, but it is not so in practice. Sometimes there is only a little trickling down, very seldom a flush; the consequence is that there is soon a deposit composed of silth and grease which no flushing you can give it from the sink or grid can remove. Why, even a drain itself, laid properly and at an even gradient, and without the intervention of a trap or syphon, if that gradient is slow, and there is any quantity of fat, will often choke sooner or later. I have seen scores of pipes and syphons taken up choked with grease and silth where there has been no fault in laying them. At a meeting of the Royal Institute of British Architects, some time in 1877, the question of grease in drains was thoroughly discussed, and Field's flush tank and Dean's gully were recommended by some speakers. I consider Field's flush tank to be the simplest and most perfect thing to use where there is a quantity of grease, and Dean's trap possesses great advantages over the ordinary gully. There are numerous other gullies also which I do not think should be so thoroughly condemned without the chance of a reply, and I think with some of your correspondents that it would be very satisfactory if some arrangements could be made for a general discussion upon the whole of the papers. CHRYSTABEL.

REFUSAL TO PAY ON ARCHITECT'S CERTIFICATE.

LOVELL *v.* CHAMBERS.

IN the Queen's Bench Division of the High Court of Justice, Westminster, a few days since, the case of Lovell *v.* Chambers came before Mr. Justice Lindley and a special jury. It was an action to recover the balance of an account under a contract.

Mr. Butt, Q.C., in opening the case of the plaintiff, said his client was a builder and contractor carrying on business at Great Marlow, in the county of Buckingham, and the defendant was a barrister residing at the same place. In 1877 the defendant engaged the plaintiff to pull down an old house known as Beechwood, at Great Marlow, and build him a new one. The claim of the plaintiff was for a balance of money due under the contract, and for extra work amounting to 1,174*l.* 17s. 10d. The total sum due under the contract, including the value of old materials, was 4,530*l.*, and, under the contract it was agreed that the builder's claim should be assessed from time to time by an architect, who, as was usual in all such cases, had power to order anything to be pulled down, and under the contract to give certificates to the plaintiff as the work progressed. The architect had thus been employed by the defendant, and the main defence to the action now appeared to be that the defendant disputed the work, which had been approved by his own architect. He (Mr. Butt) maintained that the defendant could not shirk his liability on that ground. A sum of 4,480*l.* had been paid under the contract, and the work was continued. On the 5th of September, 1879, the architect, Mr. Pope, gave a certificate to the plaintiff for 50*l.*, but the defendant refused to pay the amount, and it was only when the action had been brought that the money was paid into court. On the 21st of September the architect gave a further certificate for 876*l.*, but under the terms of the contract only half of that amount was due at the time, and consequently the plaintiff sent in his claim to the defendant for 438*l.* under the second certificate. Therefore the total claim of the plaintiff up to that time was for 938*l.* The defendant still refused to pay anything to the plaintiff, who in the meantime had to make heavy disbursements for materials supplied in respect of the works he had undertaken for the defendant. The only course which was then open to the plaintiff was to issue a writ, which he did, for the amount due, and as other sums became due to issue two other writs. The total amount which the plaintiff now sought to recover was 1,174*l.* 17s. 10d.

Evidence was called in support of the learned counsel's statement, the architect deposing that the work had been carried out to his entire satisfaction.

Mr. Finlay, on behalf of the defendant, informed the Court and the jury that behind the minor points of defence, the chief contention on behalf of his client would be that the architect had certified for the plaintiff's work to an exorbitant amount, and beyond that to which he was entitled.

The jury gave a verdict for the plaintiff for the amount claimed, with interest, less a sum of 142*l.* paid into Court.

THE ENGLISH LAND SYSTEM.

SIR,—Granted that the laws of entail should be revised, and primogeniture done away with, as they ought to be, I allow, your correspondent is in error in supposing that it would lead to peasant farming. Estates mostly pass by "settlement," seldom by "entail," and never, as a rule, through "intestacy," as any country lawyer will tell you; otherwise, how is it that in counties where primogeniture does not exist the land is not in more hands than elsewhere?

It is a proper system of registration of titles that is the *sine quâ non* of all land reforms. I thought the idea of a peasant proprietorship on the French system for England had long been exploded. They have a better climate (although, no doubt, for all sound farming, the statement of a well-known M.P., that ours was the finest climate in the world, contains truth, notwithstanding the roars of laughter it gave rise to when made), a more fertile soil naturally, and a most frugal people. If it paid, there would be plenty of small owners and farmers in this country; but it does not.

Forty years ago there were in my parish,—a very small agricultural one,—six yeomen, that is, men living on and farming their own freehold land, and probably by going further back you would find there were many more such. Now there is only one left, and he has let his land to an adjoining farmer, instead of working it himself. If it paid, why did all these hard-working, practical men give up, particularly as in this case there was no squire or rich neighbour to buy them out at a fancy price? As nearly every purely agricultural parish in England gives, I believe, more or less similar results, it seems useless to think of peasant proprietorship. My impression is this,—in a corn, cattle, sheep, and dairy country,—in fruit, poultry, and garden produce we cannot now compete with more southern countries. If your correspondent can give practical proofs that we can, throughout England, he will be a public benefactor, as in my neighbourhood, even the poors' lands, free of rent and all restrictions, find no cultivators, they tell me.

A HAMPSHIRE MAN.

WOOD PAVEMENT.

SIR,—I have a washing-down place to pave in wood blocks. Will some one kindly say the size generally used in London; and if bedded in cement joints, should they be done in Sir William Barnett & Co.'s patent process?

S. P.

CHURCH-BUILDING NEWS.

North Curry.—The parish church of North Curry is being restored under the immediate direction of Mr. John Oldrid Scott, as regards its nave, aisle, and transepts; and as to the chancel, from the designs of Mr. Ewan Christian, the architect to the Ecclesiastical Commissioners. North Curry Church is a particularly interesting one, and has a central octagonal tower, which is a most unique feature. The church stands in the midst of a graveyard, in which are the remains of a good ancient cross. One point of exceptional interest about the building is the excellent groining under the tower. The work is now being rapidly pushed forward, and it is hoped that in a few months the renovated building will be ready for re-use. Mr. Trask, of Norton-sub-Hamdon, is the contractor; the carved stone work is by Mr. Harry Hems, of Exeter; and Mr. G. Hannaford is the clerk of the works.

Stockton (*Wilts*).—The parish church of Stockton, near Codford St. Mary, Wilts, is a very interesting example of transition Norman in the nave, Early English in the lower part of the west tower, and fifteenth century for the clearstory to nave and to the aisles. The chancel is Early English, with a peculiar east window of the transition between Early English and Decorated. It has a vesica placed horizontally in the head, an almost unique example, it is believed. Then the iconostasis arrangement of the Greek Church in an English building is curious,—a mere chancel doorway and no arch, with hagioscopes on each side, all of the Early English period. The west chancel wall seems to have been built not on the lines of the original Norman chancel-arch, but further westward, so that the last small bay of the nave arcade is partly built into it. The north nave aisle contains an elaborate Elizabethan monument to John Topp, a great local benefactor. In the south aisle is a remarkable mural tomb of the thirteenth century, containing the effigy of a lady lying on her side. The upper part of the tower is fifteenth-century work. The north aisle has practically been rebuilt, the church re-seated with wainscot benches, the nave and aisle roof renewed and covered with lead, the tower underpinned and strengthened, a proper choir arrangement made, with handsome oak seats. The windows have also partly been filled with stained glass. The total cost (exclusive of decorative work) has been upwards of 1,800*l.* The architects were the late Mr. Ferrey, F.S.A., and Mr. Edmund B. Ferrey. The works were not carried out by contract, but by different tradesmen.

ROMAN CATHOLIC CHURCH-BUILDING NEWS.

West Drayton.—The Chapel of the Sacred Heart of Jesus, in St. Catharine's (R. C.) Church, West Drayton, has just been completed by the erection of an altar and reredos. The altar is of the open form, supported in the front by columns. The reredos occupies the whole width of the chapel, reaching nearly to the ceiling, and is enriched by a statue of our Lord sculptured in white alabaster, and by paintings by Mr. J. Bouvier of St. John the Evangelist and St. Margaret Mary. The materials are Caen stone and alabaster, style English, fourteenth century. The work was executed by Mr. G. F. Anstey. The side-screens of the Chapel of the Sacred Heart and of the Lady-chapel are of stone, forming integral portions of the structure, and they have been completed to the design of the architect by the execution of the carving, and of two sculptured panels, representing the Annunciation and the Agony in the Garden. A font of Caen stone has been placed in the baptistery. It is octangular on plan. Seven sides are occupied by carved emblems of the Passion; the eighth by a niche, containing the representation of the Baptism of our Lord. The font and carving to the screens were executed by Mr. McCulloch. The whole has been carried out from the designs and under the superintendence of Mr. S. J. Nicholl, architect, Caversham-road. The window of the baptistery has been filled with stained glass, executed by Messrs. Lavers, Barraud, & Westlake.

VARIORUM.

THE new edition of Walker's "Aristology, or the Art of Dining," to which we referred in our last when speaking of a "Novel Banquet," is edited and annotated by "Felix Summerly," and published by George Bell & Sons. *Ariston* is Greek for dinner, and that explains Walker's title given to a little book which may be read with as much pleasure and profit now as when he wrote it in 1835. If it be true that, as Brillat Savarin says, "the fate of nations depends upon how they are fed," more and more thought should be directed to the cookery question. The editor has supplied some capital notes, and for our own sake we hope all who may intend at any time to ask us to dinner will read it.——The *Welcome*, for July, one of Messrs. Partridge's magazines for the home circle, includes an interesting memoir of President Garfield (with a good portrait), written before the recent infamous attempt to murder him. His career has been remarkable; his origin so lowly that he was four years old before he had a shoe on his foot. Ultimately he got to college, and his course afterwards was always upwards.——The *Leisure Hour* gives some particulars of the waste-paper trade. "In London the number of wholesale dealers in waste-paper is about fifty, and the extent of the business of some of these is enormous. Two years ago the waste of the Government Stationery Office alone was valued at nearly 34,000*l.* We hope there is some diminution now, after attention has been called to the abuse, for assuredly this vast sum brought unfair perquisites to some pockets at the cost of the nation. The first process in the utilisation of waste-paper is necessarily its collection. This, in London, is principly effected by the agency of the marine-store dealers. They number some 600, and derive their supplies from all sorts of miscellaneous sources. Servants who take the paper as their perquisites, charwomen, office-cleaners, children anxious to earn a penny, thieves, frugal housewives, and the miserable individuals who, with downcast gaze, prowl the streets in search of scraps of any kind, all act as jackals to these waste-paper lions. But of late years there has been established a superior class of dealers, who buy waste-paper in large or small quantities, and send their vans to collect when the quantities are considerable and the distance is not too great. When the vendors reside in the country, sacks are sent to pack it in, and the paper may be returned either by rail or carrier, being paid for either by cheque or post-office order. Small quantities may be brought to the offices and paid for on the spot. Looking over the books of a very large and respectable dealer in this article, we find amongst his *clientèle* peeresses, bishops, colonels, clergymen, and persons of every degree; while parcels come from Sutherlandshire in the north to St. Leonards in the south, and from Cornwall in the west to Yarmouth in the east. The transactions range from 3d. to 1,700*l.*,—the former sum being paid to a little street waif, and the latter for the waste of a railway company."

Miscellanea.

Sutton Bridge Dock.—Lord Colville, Mr. Tennant, Mr. Joseph Shuttleworth, and other directors of the Great Northern Railway, together with Messrs. English, of Peterborough and Wisbech; Mr. Thorold, of Sutton Bridge; and other directors of the Dock Company, have held a consultation with Sir John Coode, C.E.; Mr. John Fowler, C.E.; Mr. Johnson, C.E., and Mr. Brunlees, C.E., on the steps to be taken to restore the Sutton Bridge Dock works. It was ascertained that no further damage of any consequence has accrued to the walls of the basin, while the massive lock-walls and invert betray no sign of settlement or injury. A few days ago it was discovered that water from the dock-basin, which is 13 acres in extent, had found its way under the foundation of the lock, and was scouring from under it the silt or sand upon which it is built, and issuing into the river. This was considered surprising, seeing that the length of the subterranean channel so excavated must be at least 300 ft., that being the distance between the front of the apron of the dock and of the lock and the edge of the apron at the river end of the lock. At low-water spring-tides the difference in level between the water in the dock-basin and that in the river outside is 24 ft.; and the powerful hydrostatic pressure of this head has to be sustained by the lock-gates, by the abutments and foundations of the lock, and by the stratum of soil which underlies the foundation. The silt, a mixture of fine sand with a small proportion of clay and the minute shelly envelopes of animalculæ, is so porous and easily transportable by water, that a slight percolation of water through it quickly erodes the soft material, and establishes a continuous current, and a trifling issue of water through a crevice will in perhaps a single hour undermine and burst up the most solid brickwork structure. This forms a remarkably difficult soil in which to construct a lock or a sluice. Engineers pronounce it treacherous, and deep scouring away of a foundation such as this at Sutton Bridge is said to be unforeseen, and an accident which no professional skill could possibly prevent. Local authorities, however, who have had extensive practice in embanking and sluice-building in this unstable silt, take a very different view. They maintain that silt is an admirable base on which to build, provided it be properly treated. It remains firm, and will support any weight, so long as no current is permitted to flow through it from a body of water having power to enlarge the volume of that current.

Shops, Albany-road, Camberwell.—A number of shops and houses have recently been erected on a portion of an estate belonging to Mr. A Stedall. The upper floors are arranged on the flat system; the fronts are faced with Suffolk bricks, the cornices, strings, and moulded reveals of windows being formed with moulded bricks; the pilasters, trusses, spandrels under arches of windows, &c., are in Box ground Bath stone. Mr. G. Green, of Clapton, is the general contractor; Messrs. Francis & Co. supplied the revolving shutters; the carving was done by Mr. J. Wormleighton; Mr. George Edwards is the architect.

The Memorial to the Late Sir Gilbert Scott.—The memorial brass which has been deposited in Westminster Abbey over the grave of the late Sir Gilbert Scott was uncovered on Wednesday by Archdeacon Jennings, in the absence of Dean Stanley, who was prevented by illness from performing the ceremony.

Strike of Deal Carriers in Gloucester.—A further difficulty has been raised in connexion with the already sufficiently depressed state of the trade of the port of Gloucester, by an unfortunate strike amongst deal carriers employed there. The following printed notice, in consequence of the continued depression in trade, was posted about the Docks a short time ago:—"The timber importers of Gloucester hereby give notice that on and after 1st July next, the rate of wages will be 3s. 6d. per day for day-work, and the piece tariff will be as under: For all deals, battens, and scantling (pitch-pine excepted) dropped within 30 ft. of the inner rail of the Midland Railway Company—deals, battens, and scantling per standard, 2s.; boards per standard, 2s. 6d. Ditto, piled up to, and within fifty yards of the inner rails, as above—deals, battens, and scantling per standard, 2s. 6d.; boards per standard, 3s. 3d., 3d. per standard extra for every additional twenty-five yards beyond the fifty yards above mentioned. Gloucester, June 20th, 1881." The men regarded this as a breach of an arrangement come to two years ago, whereby they were to be paid 3s. 6d. per day during the months between September and July, and 4s. a day in July and August. The consequence was that early on Monday the deal carriers employed by Messrs. Price & Co., Nicks & Co., Barkworth & Spaldin, Booth & Co., and T. Adams & Co., numbering about 300 in all, struck work for the extra 6d. a day. Some few men who continued work were induced to join the great majority about mid-day. The men gathered by a vessel which was being discharged for Messrs. Adams by men on piece-work, and they also struck. The masters met a deputation from the men, when they offered to concede the 4s. a day, on condition of the men accepting a reduction of 6d. per standard on piece-work. The men rejected this.

A Concrete Railway Platform.—Mr. J. B. Fraser, architect to the Great Northern Railway for the Leeds District, and Mr. Charles Trubshaw, architect for the Northern Division of the Midland Railway, attended with other gentlemen, by invitation, in an enclosed yard in Grace-street, Leeds, to witness the trial of a section of railway platform constructed on a new plan. The section, which was 18 ft. broad and 9 ft. long, was made on the 16th of December last, by Mr. Alfred Walker, maker of concrete pavement and fireproof floors. In contra-distinction to the old style of platform, that inspected was made entirely of concrete. There were five piers running lengthwise along the platform, and on these were placed the floor, which has a facing of granite concrete, all the other portion being of concrete made from the Aire-side slag. The platforms are constructed, as all builders will know, in a moist state, and sets of iron girders, 2 in. in breadth, are imbedded in the concrete to give it greater coherence. Twenty tons of pig-iron, brought from the Aireside Foundry, Hunslet, were provided. Fifteen tons of this material were piled upon a portion of the platform, 3 ft. square, and no sign of fracture was apparent; indeed, Mr. Leonard Cooper, of the above-named foundry, who was also in attendance, stated that in his opinion the platform was strong enough to bear, on the same space, a pressure of forty tons.

Failures in the Building and Allied Trades during the past Six Months.—Mr. Richard Seyd has compiled some statistics of failures in the United Kingdom during the first half of 1881. The number of failures announced in the first half of the year 1881 has been 6,270, of which 690 are in the financial, wholesale, and manufacturing branches of trade, and 5,580 in retail trade, professional pursuits, builders, publicans, among the working classes, &c. The failures in the wholesale trades included:—Engineers, founders, iron, metal, and hardware merchants, 121; and timber trade, 17. In retail trades, &c., the failures included,—Auctioneers, house-agents, and surveyors, 68; blacksmiths, 35; bricknakers, 33; builders, architects, &c., 304; cabinetmakers, upholsterers, furniture, &c., makers, 74; carpenters, joiners, wheelwrights, 132; labourers, bricklayers, slaters, &c., 82; lime burners, 2; masons, 55; plumbers, painters, gasfitters, 139; and timber dealers and sawyers, 11.

Technical Education.—The Prince of Wales, who is President of the City and Guilds of London Institute for the Advancement of Technical Education, has consented to lay the foundation-stone of the Central Institution, in Exhibition-road, South Kensington, on the afternoon of Monday next, July 18th.

The Importance of Sanitary Knowledge to Young Architects.—Last week Mr. H. Masters read a paper before the Junior Architects' Society, at the Fine Arts Academy, Bristol, in the course of which he advised the young architect to take every opportunity of observing the intelligent and the slovenly workmen in their work, and to judge for himself as to the correct mode of executing works, and not to be satisfied by following strictly the text-books, but rather to think for himself; and he pointed out some of the errors in the published model specifications. A reference was made to the mode of drainage adopted by the designers of Mediæval buildings, and also to the advice given by Vitruvius in relation to drainage and the selection of healthy sites for dwellings. Defects in the drainage of the modern builders' houses were pointed out, and it was urged that costly, elaborate systems were often introduced, to the exclusion of more simple, inexpensive, and scientific modes; examples of defective sanitation were shown by drawings, and remedies suggested. In closing, the speaker drew attention to the multiplicity of small, so-called ventilating pipes which might be seen upon a large number of the houses of Bristol, Clifton, and elsewhere, and they would find, upon investigation, that such contrivances in a large number of instances were ineffective, in consequence of being put up by those who were ignorant of the simplest principles that govern the motion of air. Such contrivances erected in ignorance gave a sense of security, but were often a delusion and a snare.

The Vyrnwy Waterworks for Liverpool. On Thursday last the first stone of the Vyrnwy waterworks was laid by the Earl of Powis. The Lake Vyrnwy will be formed by the construction of a masonry embankment across the south-eastern end of the Upper Vyrnwy Valley; the length of the lake will be 4¾ miles; area of lake, 1,115 acres; contents of the lake, above the level at which the water will be drawn for the supply of Liverpool, 11,900,000,000 gallons; available drainage area contributing to the lake, 22,000 acres; length of masonry embankment from rock to rock, 1,255 ft.; height of masonry embankment from lowest part of rock foundation to coping of parapet, 139 ft.; height of masonry embankment from river level to coping of parapet, 98 ft.; length of contributing tunnel from river Marchnant to lake, about 1¾ miles; length of contributing tunnel from river Cowny to lake, about 1¼ miles. The length of the aqueduct from the Lake Vyrnwy to the reservoirs of the Liverpool Corporation at Prescot will be 67 miles; this aqueduct will consist of a triple line of pipes and of three tunnels, two of seven-eighths of a mile and one of 2¼ miles in extent. On the line of aqueduct there will be several filter-beds and minor reservoirs. It is estimated that the daily water supply to Liverpool from this source will be (including compensation) 52,000,000 gallons.

The Indian Public Works Department. In the House of Commons on Monday last, Mr. Carbutt asked the Secretary of State for India whether any scheme for the re-organisation of the Indian Public Works Department was under contemplation, and whether it would in due course be laid before the House; and whether due consideration would in any such scheme be given to the frequent requests from the Civil Engineers in the service for an amelioration of their pension rules, and for equality of treatment generally with the officers of the Royal Engineers in the same service. The Marquis of Hartington, in reply, said: The question of re-organising the Engineering branch of the Public Works Department in India is now receiving the consideration of the Home Government, and due attention will be given to representations which have been made in respect to the pension rules and to the position generally of the officers of the department. The question will form the subject of communication between the Secretary of State and the Government of India, and when a scheme has been settled there will be no objection to lay the same before the House.

The Beaconsfield Memorial.—A site has finally been decided upon in Westminster Abbey for the national memorial to the late Earl of Beaconsfield. The spot selected is in the north aisle, on the pillar just beyond the memorial to Sir Robert Peel. The work will shortly be commenced.

Ipswich.—The new lock to the Ipswich Dock, the new Post-office, and the new Museum are to be opened on the 27th of July.

Ashburnham House.—A meeting of old "Westminsters" was held on the 11th inst. at the rooms of the Royal Asiatic Society, Albemarle-street, to protest against the proposed exchange of Ashburnham-house, standing on ground measuring 10,000 square feet, for another only covering 4,000 square feet. It was explained that by the Public Schools Act of 1868 a governing body was substituted for the government of the Dean and Chapter, and with this change also came a separation of property—15,000*l.* was handed over, together with 3,500*l.* annuity from the Commissioners, and four houses were given. The house in question was the residence of Lord Thynne, and was supposed to be built by Inigo Jones, and it was alleged by the Dean that as such it ought to be preserved as a public Art treasure, but if it remained the residence of a canon it would be less available than at present for public inspection. It was contended that as the influence of the Dean and Chapter was predominant on the governing body, that body no longer represented the interests of the school in matters between the two bodies. It was arranged that the Charity Commissioners should be asked to withhold their sanction to the proposed transfer, and a deputation was appointed to see the Commissioners on the subject.

The Proposed Removal of the Royal Mint. The Select Committee to whom the London City Lands (Thames Embankment) Bill was referred, have unanimously reported adversely to the measure. By the Bill thus rejected, the Corporation proposed to sell to the Government three acres of land on the site of the City gas-works, for 254,475*l.*, as a site for the proposed new Mint, and to purchase of the Government the site of the old Bankruptcy Court in Basinghall-street for 93,400*l.* It was estimated that the new Mint buildings would cost 110,000*l.* The committee are of opinion that there is no ground to justify this large expenditure. They think that the present Mint buildings, with some inconsiderable alterations, and with additional machinery for rolling the metals which may be placed in the room now occupied by the obsolete and disused machinery for cutting out, and with improved motive power, may, within a very reasonable period, and for a moderate outlay, be made adequate for a coinage at least as large as that contemplated in the new Mint.

The City Churches.—In the House of Lords, on Monday, the Earl of Onslow moved "That an humble address be presented to her Majesty praying that her Majesty will be graciously pleased to issue a Commission to inquire into the working of the Union of Benefices Act, 1860, and the state of the several ecclesiastical parishes in the City of London with reference to their population and to the value of the benefices attached to them, with a view to the suggestion of such further union of benefices, disposal of the site of churches, and application of the funds arising therefrom as may, with due regard to the architectural and historical features of the existing edifices, be more conducive to the efficiency of the Church in the metropolis and its vicinity." After a discussion (in the course of which Lord Houghton suggested that these fine edifices, some of which were products of the genius of Sir Christopher Wren, instead of being pulled down and ruthlessly destroyed, might be used for other, and especially for educational purposes), the motion was withdrawn.

New Floating Small-pox Hospital.—The Admiralty Board have granted to the Metropolitan Asylums Board the use of H.M. steam-ship *Atlas*, 5,260 tons, which is now being rapidly altered and fitted up, off Greenhithe, for the reception of small-pox patients. Upon completion of the work the ship will be moved higher up the river, and moored off Deptford Creek. H.M. steam frigate *Endymion*, 3,197 tons, has also been granted for use as quarters for officers in attendance on the patients, and is being fitted with a steam laundry and the necessary cooking apparatus. The alterations and fitting up of the ships are being carried out under the direction and supervision of Messrs. A. & C. Harston, architects.

The late Lord Lawrence.—Mr. Woolner's bust of Lord Lawrence in Westminster Abbey was unveiled on Tuesday last. The bust stands on a pedestal representing the Indian lotus-leaf, against the north wall of the church on the west of the gate called the Canons' door, through which a glimpse of the green turf of the Paradise and of the cloisters round it is obtained, and nearly underneath the monument of Sir James Outram. It is of Carrara marble.

The New Bridge at Battersea.—The bridge, as now sanctioned by both Houses of Parliament, will be an iron structure, erected somewhat to the east of the present bridge, at an estimated cost of 231,000*l*. The width will be increased from 23 ft. to 40 ft., and the number of spans decreased from seventeen to five, the centre one of which will be 173 ft. wide. The new bridge will be 6 ft. higher than the present one, which will allow 15 ft. above Trinity high-water mark.

Builders' Benevolent Institution.—The annual general meeting of the subscribers and donors of this charity will be held at Willis's Rooms, King-street, St. James's, on Thursday, the 28th inst., at three o'clock p.m. Part of the business consists of a proposal to alter Rule II., by leaving out in lines 3 and 4 the words, "for each candidate to be elected."

A Brickmaker's Will.—The will (dated May 27th, 1876), with four codicils, of Mr. George Smeed, late of Sittingbourne, Kent, brickmaker and farmer, who died on May 2nd last, at Gore Court, Tunstall, Kent, was proved on May 31st last, by Richard Prall and William Trees Jackson, the acting executors, the personal estate being sworn under 160,000*l*.

Messrs. Clark, Bunnett, & Co., Limited, have fitted one of their patent invalid lifts on the hospital ship *Atlas*, and are now completing the food lifts on the administrative ship *Endymion*. The company are also, we are informed, carrying out the War Office instructions to fit their revolving shutters to the embrasures of the batteries at Gibraltar.

Middlesex Industrial School for Girls. This building at Bedfont, near Feltham, Middlesex, will be inspected upon its completion on Monday, the 18th of July.

New Royal Academician.—At a General Assembly held on Wednesday evening last at Burlington House, Mr. Edwin Long was elected a Royal Academician.

Cement from Canada.—The *Liverpool Journal of Commerce* says it is expected that a large quantity of Canadian cement will be shipped to Europe this fall.

TENDERS

For Fulwood Workhouse extension, Preston Union. Mr. Joseph Harding, architect:—

John Walmsley	£13,400 0 0
W. Eaves	11,399 0 0
Albion Steam Saw Mills Company	11,350 0 0
Tullis & Son	11,096 11 10
Wm. Welsby	10,996 0 0
Wm. Whiteside	10,577 6 2
Cooper & Tullis	10,450 0 0
W. Hothersall	10,444 19 0
John Christian	10,421 0 0
John Bamber	10,390 0 0
Robert Saul (accepted)	10,323 0 0

Accommodation will be provided for 124 additional patients, with the necessary administrative departments.

For St. Stephen's Church, Wandsworth, S.W. Messrs. Lee Bros. & Pain, architects. Quantities by Messrs. Widnell & Trollope:—

Lapthorne	£8,796 0 0
Dove Bros.	8,295 0 0
Shaw	8,210 0 0
Goddard	8,196 0 0
Nightingale	7,961 0 0
Carless	7,853 0 0
Roberts	7,732 0 0
Hobson	7,670 0 0
Adamson	7,495 0 0
Pain	7,484 0 0
Parsons	7,335 0 0
Aviss & Co.	6,986 0 0

For additions to 15, Berkeley-square, for Mr. F. Lehmann. Mr. E. Hoole, architect:—

Williams & Son	£1,541 0 0
Lathey Bros.	1,457 0 0
Wm. Smith	1,190 0 0
F. Higgs	1,109 0 0
Jas. Holloway	1,099 0 0

For alterations and enlargement of Mission Hall, Short's-gardens, Endell-street, St. Giles's. Mr. W. Milford Teulon, architect:—

Hunt	£944 0 0
Read & Son	879 0 0
Langmead & Way	680 0 0
Killby (accepted)	658 0 0

For alterations and additions to the Montrose Tavern, St. James's-road, Barnsbury, for Mr. John Chinnery. Mr. W. F. Potter, architect:—

S. Godden, Bryanstone-square	£750 0 0
J. Tory, Barnsbury	694 0 0
B. Cook, Farringdon-street	671 0 0
C. Dearing & Son, Islington	442 0 0
G. W. Butler, Barnsbury (accepted)	437 0 0

For erection of chancel, vestry, &c., All Saints' Church, Wolverhampton. Mr. T. Tayler Smith, architect. Quantities by Mr. John Darch:—

Hayes	£2,050 0 0!
Jones & Co.	1,689 0 0
Bradney & Co.	1,598 0 0
Lynes	1,492 0 0
Ford & Son	1,440 0 0
Teece	1,179 0 0!

For new stables, sheds, &c., for the Stratford-upon-Avon Corporation Urban Sanitary Authority. Mr. Thos. T. Allen, town surveyor, architect. Quantities supplied by the architect:—

Bennett	£719 0 0
Compton	660 0 0
Claridge	630 0 0
Smallwood	600 0 0
Cox & Kings	580 10 0
Callaway	580 0 0
Wilkinson	572 10 0
Robbins	568 0 0
Whateley	555 0 0
Harris	551 0 0
Price	534 0 0
Hughes & Son	490 0 0
Roberts & Sons (accepted)	469 0 0
Young	458 11 10

For girls' new school-room, at the National Schools, Stratford-on-Avon. Mr. Thos. T. Allen, architect. Quantities supplied by the architect:—

Robbins	£650 0 0
Hewins	648 10 0
Kennard	602 0 0
Hughes & Son	600 0 0
Wilkinson	588 18 0
Roberts & Sons	586 0 0
Whateley	560 0 0
Harris (accepted)	542 0 0
Young	525 10 0

For erecting offices and rooms, for Mr. W. Petitt, in Blatchington-road, West Brighton:—

H. Creswell	£325 0 0
J. Collins	286 11 0
Jas. Nursombe (accepted)	285 0 0

For new road and sewer at West Hampstead:—

P. G. Pound	£723 0 0
W. H. Watts	700 0 0
W. Crockett	635 0 0
C. Killingback	595 0 0
Nowell & Robson	579 0 0

For residence at Sheffield, for Mr. O. P. Ibbotson. Mr. J. P. Earle, architect:—

Hardwick & Burton, Sheffield	£427 0 0
Armstead & Vasey, Sheffield	410 0 0
Willows, Sheffield	370 0 0
Rodley & Sons, Sheffield	367 0 0
J. Rathbone, Sheffield (accepted)	364 0 0

For rebuilding Nos. 83 and 85, Walworth-road, for Mr. Phillip Saillard. Mr. Benjamin Tabberer, architect:—

R. Conder (accepted)	£2,550 0 0

For new club premises at the Avenue, for the Blackheath Club. Mr. Benjamin Tabberer, architect:—

Nightingale	£4,292 0 0
Mark	4,270 0 0
Kirk & Randall	4,188 0 0
Staines & Son	4,062 0 0
Jerrard	3,943 0 0
Tongue	3,900 0 0
Newman	3,697 0 0
Rider & Son	3,650 0 0
Lawrance	3,600 0 0
R. Conder (accepted)	3,535 0 0

Accepted for the erection of the Bowling Green Board Schools, for the Stainland-with-Old-Lindley School Board. Messrs. Leeming & Leeming, architects. Quantities by the architects:—

Mason's Work.

Taylor & Helliwell, Stainland	£1,007 0 0

Carpenter and Joiner's Work.

Park, Stainland	294 0 0

Plumber and Glazier's Work.

Aspinall, Elland	96 0 0

Plasterer and Slater's Work.

W. Crowther, Stainland	117 0 0

Painter's Work.

Townsend, Stainland	25 0 0

Whitesmith's Work.

Hirst Bros., Halifax	110 0 0

Heating Apparatus.

Brook, Huddersfield	65 0 0
Total accepted tenders	£1,714 0 0
Total highest tenders	2,490 10 0

For the erection of Board Schools, Arnold's Paragon, Crampton-street, Newington Butts, for the School Board for London. Mr. R. R. Robson, architect:—

G. S. Pritchard	£14,100 0 0
Higgs & Hill	13,628 0 0
Staines & Son	13,489 0 0
Hook & Oldrey	13,389 0 0
B. E. Nightingale	13,173 0 0
W. Tongue	13,098 0 0
C. Wall	13,000 0 0
J. Marsland	12,835 0 0
W. Shepherd	12,821 0 0
Kirk & Randall	12,659 0 0

For the enlargement of Board Schools, Lant-street, Borough, for the School Board for London. Mr. R. R. Robson, architect:—

J. Grover	£4,791 0 0
Kirk & Randall	4,586 0 0
Staines & Son	4,549 0 0
Tongue	4,497 0 0
S. J. Jerrard	4,473 0 0
Higgs & Hill	4,443 0 0
B. E. Nightingale	4,283 0 0
W. Shepherd	4,273 0 0

For rebuilding printing works, for the *City Press*, 16, New-street, Cloth-fair, for Messrs. W. H. & L. Collingridge. Messrs. Collier & Merrin, architects:—

Brass (accepted)	£6,600 0 0

For forming roads and sewers in the first section of eight proposed new roads, Clapham Park, on the south side of Clapham-common. Messrs. Waring & Nicholson, surveyors:—

Chafen	£940 0 0
Mayo	823 15 0
Rigby	795 0 0
Blackmore	790 0 0
Nobbs	760 0 0
Iles (accepted)	700 0 0

For the erection of new Wesleyan Chapel, Streatham. Mr. Chas. Bell, architect. Quantities by Mr. H. Lovegrove and Messrs. Sandall & Corderoy:—

Maxwell	£7,980 0 0
Tyerman	8,030 0 0
Tarrant	7,872 0 0
Dove Bros.	7,695 0 0
Brealey	7,620 0 0
Taylor & Grist	7,595 0 0
Woodward	7,571 0 0
Watson	7,509 0 0
F. Higgs	7,320 0 0
Hickinbotham	7,250 0 0
Bowyer	7,120 0 0

For alterations and repairs to the Islington Presbyterian Church, Colebrooke-row. Mr. Chas. Bell, architect:—

Panter & Powditch	£790 0 0
Ebbage	782 0 0
Grover	756 0 0
Wontner Smith, & Son	680 0 0
Bamford (accepted)	665 0 0

For the erection of a dwelling-house, Abingdon, for Mr. Job Coxeter. Mr. Edwin Dolby, architect. Quantities by the architect:—

Allen, Leicester	£1,049 0 0
Barrett & Drew, Abingdon	950 0 0
Dover, Oxford	950 0 0
Wilkins & Sons, Eynsham	939 0 0
R. Drew, Abingdon	887 10 0
Selby, Oxford	810 0 0
Holland, Thame	800 0 0
Hunt, Abingdon	774 0 0
Kingerlee, Banbury	748 0 0
Buckle & Wheeler, Abingdon*	728 0 0

* Accepted.

For the erection of a new shop, &c., at Single Gate, Merton, for Mr. W. Goodyear. Mr. R. Cruwys, architect:—

Stayner, Great Dover-street	£647 0 0
Johnson, Wimbledon	638 0 0
Barwell, Merton	586 0 0
Norris, Tooting	582 0 0
Richardson, Clapham	569 0 0
Rice, Clapham	531 0 0
Robinson, Wandsworth (accepted with modifications).	

For additional story to the Hand and Flower, Parnell-road, Bow, for Mr. J. Burgess. Messrs. Hills & Fletcher, architects:—

Brooks	£418 0 0
Lewin	417 0 0
Coles	398 10 0
Alexander, Bow (accepted)	247 0 0

For constructing new road and sewers at Jeremy's-green, Edmonton, for the Committee of Ray's Estate:—

Rutty	£999 0 0
Nichols	957 0 0
Wilkes & Co. (accepted)	947 16 0

For works in remaking and draining roadways, for the Guildford Urban Sanitary Authority. Mr. H. Peak, surveyor:—

Harvey-road:—

W. Smith & Sons, Guildford	£1,373 0 0
R. Pink, Milford	1,350 0 0
Martin, Wells, & Co., Aldershot*	1,239 0 0

* Accepted.

Guildford Park-road:—

Martin, Wells, & Co., Aldershot	£410 4 9
R. Pink, Milford	410 0 0
W. Stafford, jun., Godalming	370 0 0
W. Smith & Sons, Guildford (accepted)	380 4 0

Upperton-road:—

Martin, Wells, & Co., Aldershot	£153 18 6
R. Pink, Milford	150 0 0
W. Stafford, jun., Godalming	136 15 0
W. Smith & Sons, Guildford (accepted)	132 10 0

Densil-road:—

R. Pink, Milford	£195 0 0
Martin, Wells, & Co., Aldershot	180 12 6
W. Stafford, jun., Godalming	173 6 0
W. Smith & Sons, Guildford (accepted)	169 10 0

For alterations to the Trafalgar-road School, Horsham, for the Horsham School Board. Mr. W. Buck, architect:—

Peters & Redford, Horsham	£885 0 0
Sharp, Horsham	875 0 0
H. Potter, Horsham (accepted)	845 0 0

For alterations at the Trevor Arms, Knightsbridge Mr. H. R. Cotton, architect:—

Canning & Mullins	£1,035 0 0
Toms	994 0 0
Foxley	978 0 0
Stimpson & Co.	933 0 0

For the erection of a boiler-house and chimney-stack at Homerton Fever Hospital. Mr. John Walker, C.E., architect. Quantities supplied:—

Crockett	£657 0 0
Sawyer	620 0 0
Ivory	620 0 0
Garrud	583 0 0
Carpenter & Pool	580 0 0
J. O. Richardson	520 0 0
Crisp & Tomlin	509 0 0

For the erection of six dwelling-houses at Grange Park-road, Leyton, Essex, for Mr. A. Bacon. Mr. W. C. Livermore, architect:—

Hosking	£2,368 0 0
Sills	1,840 0 0
England & Thompson (accepted)	1,590 0 0

For cleaning and painting Paddington Chapel, Marylebone-road:—

W. Lovell	£253 10 0
C. Parry	230 0 0
J. Morris	226 4 6
S. Spencer & Son	224 10 0
W. Tasker	220 0 0
J. Petchey	205 0 0
W. H. Butcher (accepted)	179 19 0

For road and sewer works on the United Land Company's Starch-green Estate, No. 2:—

L. Coat	£1,734	0	0
C. Killingback	1,630	0	0
Wilkes & Co.	1,585	0	0
Jas. Trueman	1,519	0	0
Neave & Son	1,498	0	0
Jas. Neal	1,495	0	0
T. Huntley	1,480	8	6
G. George	1,440	0	0
Job Ball	1,390	0	0
John Cardus	1,390	0	0
Jas. Bloomfield	1,388	11	0
Geo. Acock	1,343	0	0
Jas. Stockwell	1,335	0	0
T. Pizzey	1,265	0	0
Nowell & Robson	1,260	0	0
Geo. Felton	1,229	0	0
H. Kempling	1,144	0	0
Geo. Aldred	1,105	0	0
Ford & Everett (accepted)	1,088	0	0

For the pulling down and rebuilding of 22, Budge-row, Cannon-street. Mr. E. E. Cronk, architect. Quantities supplied:—

Howard & Dorrell	£4,047	0	0
Cole & Riches	3,949	0	0
G. Parker	3,907	0	0
Julian & Co.	3,800	0	0
Macey & Sons	3,664	0	0
R. Conder	3,595	0	0
D. Jones & Co.	3,580	0	0
J. P. Groome	3,575	0	0
Young, Cochrane, & Fraser	3,410	0	0
John Garrud	3,283	0	0
Carpenter & Poole	3,235	0	0
Lucas & Son	3,169	0	0
J. O. Richardson	2,999	0	0
F. Warr	2,879	0	0

For the erection of Camden Parsonage, Chislehurst. Mr. Alfred R. Pite, architect. Quantities by Mr. Rookwood:—

Grover	£3,434	0	0
Hobson	3,453	0	0
Niblett	3,400	0	0
Patman & Fotheringham	3,348	0	0
Gumbrell	3,250	0	0
Falkner	3,235	0	0
Tongue	3,207	0	0
Diss	3 200	0	0
Cowland	3,195	0	0
Smith & Son	3,187	0	0
Staines & Son	3,172	0	0
Evans	2,925	0	0

For new roads, sewers, surface-water drains, and bridges over Pymmes Brook, for the British Land Company, Limited, on their East Barnet Estate. Mr. Henry B. Michell, surveyor:—

Killingback, Camden Town	£6,700	0	0
Pizzey, Hornsey	6,666	0	0
Acock, City	5,728	0	0
Jackson, Leyton	5,555	0	0
Peill, Bromley	5,520	0	0
Wilson, Walthamstow	5,500	0	0
Harris, Camberwell	5,490	0	0
Crockett, St. Pancras	5,357	0	0
Thompson & Son, Battersea*	5,245	0	0

* Accepted.

For new roads and surface-water drains, for the British Land Company, Limited, on their estate at Barking. Mr. Henry B. Michell, surveyor:—

Crockett, St. Pancras	£996	0	0
Acock, City	716	0	0
Harris, Camberwell	660	0	0
Wilson, Walthamstow	654	0	0
Killingback, Camden Town	650	0	0
Peill, Bromley	640	0	0
Thompson & Son, Battersea	600	0	0
Pizzey, Hornsey	589	0	0
Jackson, Leyton (accepted)	555	0	0

For new road and sewer for the British Land Company, Limited, on their Estate at Loughton. Mr. Henry B. Michell, surveyor:—

Crockett, St. Pancras	£805	0	0
Wilson, Walthamstow	775	0	0
Acock, City	737	0	0
Thompson & Son, Battersea	700	0	0
Killingback, Camden Town	680	0	0
Harris, Camberwell	675	0	0
Peill, Bromley	660	0	0
Pizzey, Hornsey	637	0	0
Jackson, Leyton (accepted)	633	0	0

For the erection of twenty-two cottages at Barking-road, East Ham, Essex. Mr. W. C. Livermore, architect:—

Sills (accepted)	£3,080	0	0

For residence, with studio, King's-road, Windsor, for Mr. J. H. Henry. Mr. Maurice B. Adams, architect. Quantities by Mr. H. Lovegrove:—

	House.	Conservatory.	Deduct if alternative.
W. Hearn, Lancaster Gate	£5,580	£389	£189
J. Norris, Staines	4,650	250	140
Woodward, Finsbury	4,237	280	110
Goddard & Sons, Farnham	3,990	228	90
Martin, Wells, & Co., Aldershot	3,950	210	80
Hickinbotham, Teddington	3,680	210	45
W. Watson, Ascot	3,445	243	87

For alterations and additions to No. 18, The Avenue, Bedford Park, Chiswick. Mr. Maurice B. Adams, architect:—

J. Pollard, Paddington (accepted).

For alterations and additions at Laurel-cottage, Twickenham, for Mr. F. G. Beresford. Mr. E. A. B. Crockett, architect:—

Greenwood	£930	0	0
Messum	725	0	0
Brunsden (accepted)	675	0	0

TO CORRESPONDENTS.

A Beginner (one of the Health Societies of the Metropolis gives certificates, after examination, at a certain period of the year).—S. & Son (we have written for the architect's assent).—T. H. M. (next week).—H. M. and W. G. (under our mark).—P. P. (ditto).—3 (ditto).—E. & G. (should have sent names and amount.)—B. N.—E. K.—O. & E.—W. S.—W. P. G.—J. C.—J. S. & Co.—M. B. A.—G. M.—M. & Co.—W. G. S.—R. C.—A. & C. H.—R. C.—P. D. T.—A. G.—M. & Son.—E. F. jun.—W. T. V.—E. D.—Quantity Man.—R. C.—B. H. T.—H. & F.—W. & N.

All statements of facts, lists of tenders, &c. must be accompanied by the name and address of the sender, not necessarily for publication.

We are compelled to decline pointing out books and giving addresses.

NOTE.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.

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Addressed to No. 46, Catherine-street, W.C.

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Is the best for use in all exposed positions, being a well-known and tried weather stone.
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